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THE CAREER GOALS AND PATHWAYS OF FULL-TIME NON-TENURE-TRACK ENGINEERING FACULTY

A DISSERTATION APPROVED FOR THE
GALLOGLY COLLEGE OF ENGINEERING

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This dissertation is dedicated to my wife, Mariavis, whose encouragement and persistence made it possible. To my children, Lucy and Jack, who bring joy to my life. I also dedicate it to the thousands of engineers whose vocation is accompanying others, guiding them to the excitement and wonder found in the beautiful, elegant profession of engineering.

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Abstract

This study explores the beliefs and experiences of full-time non-tenure-track faculty members who teach in the engineering programs of public four-year research universities in the United States. Thirteen full-time non-tenure-track engineering faculty were interviewed resulting in sixteen hours of interview data. Data collected via semi-structured interviews reveal each participant's pathway into engineering, their career goals, career advancement opportunities available to them, and factors that motivated them to pursue a career as a full-time non-tenure-track engineering faculty member.

The interview data are coded and analyzed using qualitative analysis software (NVivo) and a constant comparative coding method. Themes emerge from the data which address the research questions along with themes that were not expected.

The results of this study show that non-tenure-track faculty have a remarkable variation in both academic experience and professional experience. They are motivated to pursue non-tenure-track positions by a desire to interact with students and to teach in a classroom environment. Non-tenure-track faculty do not desire tenure-track positions although they do desire aspects of tenure, specifically meaningful career advancement, higher salaries, increased career stability, and the respect of their peers. Full-time non-tenure-track engineering faculty are satisfied with their careers although a lack of respect from their tenure-track colleagues and administration, exclusion from participation in departmental governance, and a culture that diminishes the value of their work as teachers cause significant dissatisfaction.

Understanding the experiences of non-tenure-track faculty can help programs improve the satisfaction and performance of their non-tenure-track faculty members by

implementing policies that value the prior career experience of non-tenure-track faculty, provide a career path that is aligned with their goals, and signal to the non-tenure-track faculty member that they and their contributions are valued by the department and institution.

Chapter 1: Introduction

Purpose of the Study

The purpose of this study is to explore the beliefs and experiences of non-tenure-track engineering faculty members teaching in four-year research universities in the United States. The participants in this study share their experiences of being non-tenure-track engineering faculty and answer two fundamental questions about their careers: "Where have you come from?" and "Where would you like to go?"

Definition of Terms

In this study, faculty members who are in appointments that offer tenure are referred to as tenure-track whether they are tenured or pre-tenure. Faculty who are in appointments that do not offer tenure are labeled non-tenure-track.

In this study, the label non-tenure-track, when used alone, denotes faculty members who are either part-time or full-time and are not graduate students. Whether full-time or part-time, the faculty member's primary responsibility is teaching; faculty members whose primary responsibility is research are excluded. The criteria for being considered full-time varies by institution (GAO, 2017). The label part-time refers to faculty members who are not considered full-time by their institution. In this study, the term adjunct is a synonym for part-time non-tenure-track faculty.

Engineers who perform engineering work outside academia, usually for corporations or governmental agencies, are referred to as "practicing engineers" or "engineering professionals". These labels are not intended to imply that engineers working in academia are neither professional nor practicing.

In this study, the term universities refers to universities located in the United States.

Background of the Problem

Higher education enjoyed a special status among American institutions in the middle decades of the twentieth century (Baldwin & Chronister, 2001). Most faculty worked within a tenure system which provided excellent career stability, academic freedom, and autonomy. During the latter part of the twentieth century, however, higher education began to lose this favored status. Higher education analysts (Bok 1992; Fairweather, 1996) have discussed the decline of public trust in higher education from a variety of perspectives, including a perceived decline in institutional commitment to undergraduate education (Baldwin & Chronister, 2001). At the same time, public funding for higher education declined, putting significant budgetary pressure on university administrations. For research universities, one method to demonstrate commitment to undergraduate education while maintaining a research focus and operating within budget is employing faculty who are not tenured and whose primary responsibility is teaching. Since non-tenure-track faculty typically do not have research responsibilities, they can teach more classes, especially large undergraduate courses that many research faculty would prefer not to teach. In the last two decades, the number of non-tenure-track faculty, both full-time and part-time, has grown much faster than the tenure-track faculty (Curtis & Jacobe, 2006). In 2017, the majority of higher education faculty are non-tenure-track (GAO, 2017) and most courses taught in four-year universities are taught by non-tenure-track faculty.

The shift in faculty appointment type has been portrayed by some as an attack on the tenure system that threatens the stability of the profession, reduces the size and influence of tenured faculty, and degrades the quality of undergraduate education (AAUP, 1993; Curtis & Jacobe, 2006). Quantitative studies show that undergraduate education suffers when non-tenure-track faculty teach. Non-tenure-track faculty spend less time preparing for class, spend less time with students, hold fewer office hours, are less productive in both research and teaching, and are less likely to use active-learning techniques (Umbach, 2007; Bland, Finstad, Risby, & Staples, 2006; Davis, 2012). Contingent worker theory predicts that non-tenure-track faculty, as contingent workers, would have lower commitment to their students and to their institution which negatively impacts both student performance and student retention (Pintrich, 2000; Tinto, 1987).

While these quantitative studies are convincing and lead to the conclusion that universities should avoid hiring non-tenure-track faculty and students should avoid enrolling in courses that are taught by non-tenure-track faculty, those conclusions contradict the empirical evidence, especially for non-tenure-track engineering faculty. Non-tenure-track faculty report high job satisfaction and administrators report that they are in excellent teachers, bringing fresh perspectives and skills into their classrooms (Hollenshead et al., 2007; Cross & Goldenberg, 2011).

The terms used to refer to faculty members who are in positions that do not offer tenure are problematic. This group is consistently referred to by two labels in the literature: non-tenure-track and contingent. Both labels are unfortunate because they label the faculty member by what they are not, tenured and permanent. Contingency has a negative connotation in the occupational psychology literature, denoting a worker who

is typically not willing to commit to the organization because the organization is not willing to commit to them. Contingent workers are less satisfied with their work and perform at a lower level (Liden, Wayne, Kraimer, & Sparrowe, 2003). The label of contingent is inappropriate for faculty in appointments that do not offer tenure because they are often long-term employees of their institution and are committed to their students and their institution, in contradiction to the predictions of contingent worker theory. (Baldwin & Chronister, 2001). Contingent faculty members typically enjoy greater job security than most employees in the United States with the exception of tenured positions in higher education. Non-tenure-track is also an undesirable label because it encourages a deficit-model interpretation of the faculty member in which tenured is considered normal and ideal (Levin & Shaker, 2011). A more appropriate label for this type of faculty might be teaching faculty, which correctly describes their increased focus on teaching.

Listening to the voices of the non-tenure-track faculty themselves can provide another perspective regarding the discrepancy between the dire predictions of the quantitative studies and the rosier picture portrayed by surveying administrators. Qualitative research methods can be used to effectively study complex social structures such as engineering departments and to understand the relationships and interactions within them. (Trytten, Lowe, & Walden, 2012; Foor, Walden, & Trytten et al., 2007; Seymour, 2000; Lareau, 2003; Creswell & Creswell, 2017). Gappa and Leslie's book, Invisible Faculty, used qualitative methodologies to probe the working conditions of adjunct faculty. They found adjunct faculty work in cultures that degrade their performance and do not have the opportunity to perform at the same level as their

tenured and pre-tenure colleagues who enjoy the privilege of institutional support (Gappa & Leslie, 1993). Drawing on Blumberg and Pringles's work on motivation (Blumberg & Pringle, 1982), Kezar found that departmental culture has a significant effect on both the willingness of the non-tenure-track faculty to perform and in their opportunity to perform (Kezar, 2013). Most non-tenure-track faculty work in departments that are neutral or indifferent to them as faculty members. While full-time non-tenure-track faculty have better support and can forge relationships that sometimes mitigate the negative structural effects of a negative or neutral departmental culture, part-time faculty are especially vulnerable to the cultural effects that make their work more difficult and reduce their effectiveness as teachers. Departmental cultures that blunt the effectiveness of non-tenure-track faculty forgo the opportunity to benefit from the significant career experience of their non-tenure-track faculty.

Engineering non-tenure-track faculty are different from non-tenure-track faculty in many other disciplines because they have better career prospects outside the university. Professional engineers enjoy a historically low unemployment rate, currently below one percent, and a high median salary, currently $94,310 (BLS, 2018). Some studies portray part-time non-tenure-track faculty driving from university to university, attempting to cobble together the equivalent of a full-time position out of several part-time positions but failing to provide a living wage (Gappa & Leslie, 1993; Baldwin & Chronister, 2001). This scenario seems unlikely for engineers who would have no trouble finding employment with earnings far above a living wage while teaching as an adjunct. Studies describing full-time non-tenure-track faculty members working in departmental cultures that are indifferent or destructive to them (Kezar, 2013) are hard

to translate to engineering NTT faculty. What would motivate an engineering non-tenure-track faculty member to endure those cultures when better career opportunities are available outside the university? Clearly there are forces at work within the engineering profession and within engineering non-tenure-track faculty that are different than the general population of teaching faculty.

It is more likely that engineers are what the literature refers to as "specialty hires" (Baldwin & Chronister, 2001; Gappa & Leslie, 1993; Hollenshead et al., 2007). Administrators recruit specialty hires to acquire skills and perspectives that may not already exist in the department. Ideally, one can imagine the full-time non-tenure-track faculty members providing a complementary set of skills and perspectives to the department, enriching the program by providing greater diversity of thought and experience. For engineering programs within research universities, this diversity of experience is especially valuable considering that pursuing a tenure-track position generally precludes pursuing a professional career.

The shift towards non-tenure-track faculty appointments is not likely to abate and can be an opportunity for engineering programs. The challenge is to restructure academic culture so that all faculty can be successful and contribute to the goals of the institution (Gappa, Austin, & Trice, 2007). Restructuring programs to unlock the abilities of the non-tenure-track faculty and to remove structural obstacles that impede their performance is urgent. Effective restructuring cannot be accomplished without first understanding the structure from the non-tenure-track faculty members' perspective. Attempting to correct a problem that is not fully understood, or worse is based on stereotypes, can lead to solutions that do not address the root of the problem

and are not effective. Many programs are interested in changing their structure and in supporting all faculty, this study aims to inform those efforts and to make them more effective (Hollenshead et al., 2007).

Significance of the Study

This study is significant because it provides insight into the working lives of thirteen non-tenure-track engineering faculty from their perspectives. This viewpoint is important and missing from much of the literature regarding non-tenure-track faculty (Hollenshead et al., 2007).

This study focuses on engineering faculty specifically. Much of the existing literature covers a broad range of disciplines, sometimes including engineering, sometimes not. There is reason to believe that non-tenure-track faculty in disciplines such as engineering and business would have a different career experience due to their robust supply of working professionals and excellent career prospects outside the university. (Baldwin & Chronister, 2001). This study explores the experience of engineers who have chosen to become full-time engineering teachers. This perspective has not been previously studied and fills a gap in the existing knowledge regarding non-tenure-track faculty.

Research Questions

Questions present themselves when applying the literature regarding non-tenure-track faculty to the engineering profession. The research questions of this study probe the experiences of full-time non-tenure-track engineering faculty and the answers provide insight for non-tenure-track faculty work unique to engineering.

One area of investigation in this study is to explore the prior career experience of full-time non-tenure-track engineering faculty and how they believe that prior experience informs their teaching. What motivates engineers to leave or forgo professional engineering careers to pursue teaching careers at a university? How does their prior career experience affect their teaching career? The first two research questions explore the participants' prior career experience and pathway into their teaching career.

Another area of investigation in this study is the career goals of non-tenure-track engineering faculty. Three research questions explore the participants' beliefs and attitudes regarding tenure as well as the desirability and attainability of tenure. Participants describe their beliefs, satisfaction, and attitude towards the opportunities for career advancement and working conditions in their department. Understanding which aspects of tenure-track positions are attractive and unattractive to non-tenure-track faculty members will help departments craft alternate career tracks that are desirable and satisfying to non-tenure-track faculty.

The research questions regarding career pathways are:

1. What are the academic and career experiences of full-time non-tenure-track engineering faculty?
2. What factors motivate full-time non-tenure-track engineering faculty members to pursue a teaching career?

The research questions regarding career goals are:

1. Do full-time, non-tenure-track engineering faculty desire tenure-track positions?

2. What career progression, if any, is available to full-time non-tenure-track engineering faculty members?
3. What aspects of tenure, if any, do full-time non-tenure-track engineering faculty members find attractive and which, if any, do they find unattractive?

Delimitations and Assumptions

This study is an inductive qualitative study with a sample size of thirteen participants. The participants are all full-time non-tenure track faculty members teaching in electrical engineering departments in the United States. In this study, it is assumed that the experience of non-tenure-track electrical engineering faculty is similar to the experience of non-tenure-track engineering faculty in other engineering disciplines, although disciplinary differences within engineering in pay, job availability within geographic areas and job volatility exist.

Subjectivity Statement

Like the participants in this study, I am a full-time non-tenure-track faculty member who teaches in an electrical engineering program at a large, public university in the United States. When this study began, I had taught full-time for about six years and as an adjunct for ten years before that. I became interested in this research area because I felt in my own career that there are stereotypes and assumptions about non-tenure-track faculty that are inaccurate and are misleading. I believe that in general, non-tenure-track faculty members who choose to teach are good teachers and they improve programs by bringing their experience into the classroom. My own experience is not

one of being exploited or of being a "workhorse" faculty but I understand that non-tenure-track faculty in other programs do feel that way and it made me wonder if engineering was different from other programs in which the adjuncts do not seem to fare as well.

This study examines three aspects of the participants' careers: career goals, career pathways, and respect and inclusion. Here I disclose my beliefs about each subject to help the reader understand and bracket my biases. Regarding career goals, my career goal is to remain non-tenure-track, or as I would prefer to call it "teaching track". I believe that an alternate career track is an appropriate way to address the division of labor between teaching and research in engineering programs. Regarding career pathways, I practiced engineering while teaching as an adjunct faculty for a total of eighteen years before accepting a full-time position. I believe that my prior engineering career is valuable in the classroom and I believe that engineering programs are significantly enriched by inviting practicing professionals to teach selected courses. Finally, regarding respect and inclusion, I believe there is a widespread bias against non-tenure-track faculty members in universities in general and engineering programs in particular. I will leave specific examples to the participants, but none of the examples of disrespect and exclusion were surprising to me. This topic was difficult for me to bracket, the responses of the participants were stirring to me personally and the reader should be aware of it.

While performing this research, it was impossible for my background and my beliefs to not affect the way in which I performed the interviews and in the way I analyzed the data. I attempted, to the best of my ability, to bracket those feelings and

beliefs. I attempted to not let the participants know my feelings until after the interview was completed. When analyzing the data, I attempted to give all emergent themes equal treatment and not only the ones that fit my beliefs. However, I must acknowledge that my experience and beliefs affected the probing questions that I asked and the emergent themes that I deemed salient. My advisors, who collaborated with me during data analysis and theme identification, mitigated these effects by challenging assumptions or stereotypes that were not well supported by the data.

Chapter 2: Literature Review

Tenure-Track and Non-Tenure-Track Appointments

Over the last forty years, an unmistakable shift has occurred in the type of appointments held by university faculty members in the United States. In 1975, fifty-seven percent of teaching faculty at US universities were either tenured or in tenure-track positions while forty-three percent of faculty were in non-tenure-track appointments (Curtis & Jacobe, 2006). Forty years later, the majority of teaching faculty are now in non-tenure-track appointments. In 2011, twenty-eight percent of teaching faculty were either tenured or tenure-track, while seventy-two percent of teaching faculty were in appointments that do not offer tenure (GAO 2017). From 1995 to 2011, the number of full-time tenure-track positions, which includes tenured positions, grew by 9.6% while the number of full-time non-tenure-track positions grew by 109.2%. (GAO, 2017). The GAO found that in a sample of three states, non-tenure-track faculty now teach more than one-half of all courses at four-year universities.

The Need for Accurate Non-Tenure-Track Faculty Models

The increased number of non-tenure-track appointments, especially the rapid growth of part-time non-tenure-track appointments, has caused alarm. In 1993, the American Association of University Professors (AAUP) reported that the increased use of non-tenure-track faculty negatively affects the quality of undergraduate education as a whole, diminishes the size and impact of the tenured faculty, and leads to an increasing portion of the faculty susceptible to exploitation and manipulation (AAUP, 1993). The AAUP is an organization that endorses academic freedom and shared governance (AAUP, 2018), that is typically best protected by tenure. Although their

membership includes both tenure track and non-tenure-track faculty, they have a vested interest in protecting the institution of tenure.

There is evidence that the increased use of non-tenure-track faculty has a negative effect on undergraduate education. Quantitative studies using large, national data sets found that non-tenure-track faculty spend less time interacting with students, especially out of class, and expect slightly less of their students when compared to their tenured and tenure-track peers (Umbach, 2007). Additionally, part-time non-tenure-track faculty spend less time preparing for class than either tenure-track or full-time non-tenure-track faculty (Umbach, 2007). Data from the 1999 National Study of Postsecondary Faculty show that tenured and tenure-track faculty are significantly more productive in research, more productive in teaching, are more committed, and work about four more hours per week (Bland et al., 2006). One author recommends that students who are choosing a university or a program ask questions about who will be teaching their courses, carefully considering the quality of educational experience they are likely to receive if their course is taught by a non-tenure-track faculty member as opposed to a tenured or tenure-track faculty member (Umbach, 2007).

These predictions, however, contradict the evidence of satisfaction, productivity, commitment, and engagement of non-tenure-track faculty. Kezar posits that researchers, especially quantitative researchers with a positivist epistemology, may bring to their study models that do not accurately describe non-tenure-track faculty (Kezar & Sam, 2011). These models often hold tenure-track faculty up as an ideal, measuring deviations from that ideal as a deficit. The use of a deficit model is evident in the finding that full-time non-tenure-track faculty spend less time with students outside of

class than their tenure-track peers. This finding is misleading as it measures interaction in a manner that inaccurately equates the expectations for tenure-track and NTT faculty. One category used to measure out-of-class interaction is faculty "working with undergraduates on research" (Umbach, 2007). Since most non-tenure-track faculty do not pursue research and most tenure-track faculty do, it should be expected that tenure-track faculty spend more time on this activity. In fact, the survey from which the data were taken measures activities that are typical activities of tenure-track faculty members. While non-tenure-track faculty members may also engage in these activities, activities that are unique to non-tenure-track faculty members did not appear on the list. Similarly misleading is a study showing that tenure-track faculty are more productive in terms of writing textbooks, getting research grants, publishing articles, chairing committees, and teaching courses (Bland et al., 2006). Again this metric of productivity sets the activities of a tenure-track faculty as the benchmark against which the activities of non-tenure-track faculty are evaluated. Most of the activities in the preceding list are not expected of non-tenure-track faculty.

Economic models casting non-tenure-track faculty as contingent workers predict that non-tenure-track faculty would be dissatisfied and have a low level of commitment to their department and to their students (Liden et al., 2003). The evidence does not support this prediction. Eighty-eight percent of non-tenure-track faculty report being satisfied with their employment overall. Organizational commitment and engagement on the part of non-tenure-track faculty are also higher than contingent worker theories would predict (Ott & Cisneros, 2015; Waltman, Bergom, Hollenshead, Miller, & August, 2012).

The theories and approaches used to frame many studies of non-tenure-track faculty are flawed, having been influenced by researcher biases, assumptions, and stereotypes (Kezar, 2011). These theories overlook many benefits that non-tenure-track faculty bring to a program. New theories and approaches are necessary to understand non-tenure-track faculty and their effect on undergraduate education. Developing new theories requires an understanding of the non-tenure-track faculty themselves.

A Heterogeneous Group

Non-tenure-track faculty are not a homogeneous group (Hollenshead et al., 2007). Attempting to analyze non-tenure-track faculty without understanding the diversity within the group leads to confounded results and is misleading.

Non-tenure-track faculty may be part-time or full-time faculty members. They may have access to departmental resources such as office space, supplies, office equipment, and staff support or they may not have access to any of those resources. They may work on a semester-by-semester basis, have an annual contract, or a multi-year contract. They may or may not qualify for health care and retirement benefits. They are funded from a variety of sources. If they are part-time faculty, they may be retired from their profession, work as a full-time professional, or choose to work part-time only (Gappa et al., 2007; Kezar, 2013).

Gappa and Leslie's study of part-time non-tenure-track faculty demonstrates the importance of considering the heterogeneity of non-tenure-track faculty. By interviewing part-time non-tenure-track faculty, Gappa and Leslie found that their participants could be modeled as one of four different types of faculty. Aspiring academics take part-time non-tenure-track positions hoping that a tenure-track position

will become available. Career-enders have retired from either an academic position or from a professional position and want to teach a class or two, having no desire to work full-time. The specialist has a full-time career outside of the university and wants to teach a class on the side. The freelancer has a personal or family situation that makes it difficult for them to work full-time and so they choose to teach part-time. Each type of faculty had a unique reason for pursuing a part-time teaching career and had unique career goals (Gappa & Leslie, 1993).

Understanding concerns and needs of each group helps frame the understanding of the non-tenure-track faculty experience. For example, career-enders and specialists may be less concerned by the lack of health insurance offered to non-tenure-track faculty because they already have health insurance provided by their primary employer. For the aspiring academics, the opportunity for career development and a path to full-time employment is important. Understanding non-tenure-track faculty requires consideration of the varied academic and professional experiences of the group.

Full-Time and Part-Time Non-Tenure-Track Faculty

An important dimension of non-tenure-track faculty is whether the faculty member is in a full-time position or a part-time position. Full-time non-tenure-track faculty and part-time non-tenure-track faculty have similarities yet have significant differences. Part-time faculty often have outside employment and do not desire a full-time position, much less a full-time tenure-track position (Gappa & Leslie, 1993). This is especially true for fields with a robust demand for professionals such as business and engineering. The level of appointment also influences how NTT faculty are treated by the institution. Institutions are more likely to use a formal search process to find full-

time non-tenure-track faculty and an informal process to find part-time faculty (Hollenshead et al., 2007). Institutions are more likely to give full-time non-tenure-track faculty access to resources such as office space, staff support, and technology and access to benefits such as health insurance and retirement plans. Full-time non-tenure-track faculty are more likely to advise students, serve on committees, and participate in departmental governance (Hollenshead et al., 2007). Full-time non-tenure-track faculty are more likely to develop working relationships with tenure-track faculty members which can shield them from the effects of a negative departmental culture. Part-time faculty are especially vulnerable to negative departmental cultures (Kezar, 2013).

Combining both full-time and part-time non-tenure-track faculty into one group for analysis is not useful because the significant differences between the two groups can mask the meaningful interpretation of results. It is more useful to categorize faculty into three groups: tenure-track (including tenured) faculty, full-time non-tenure-track faculty, and part-time non-tenure-track faculty (Hollenshead et al., 2007).

Motivation for Institutions to Hire Non-Tenure-Track Faculty

University administrators hire non-tenure-track faculty to meet various needs of their departments (GAO, 2017; Hollenshead et al., 2007). Administrators hire non-tenure-track faculty, especially part-time faculty, to respond to increases in student enrollment. This flexibility is particularly valuable when the increased enrollment is sudden or temporary. Budget uncertainty also drives the hire of non-tenure-track faculty. Since non-tenure-track faculty appointments are often temporary or renewable, they do not require the long-term funding commitment that a tenure-track faculty member does.

Administrators also hire full-time non-tenure-track faculty to relieve the teaching load of tenure-track faculty, freeing tenure-track faculty to pursue research or to teach more specialized courses aligned with their research areas. Non-tenure-track faculty can assume the teaching duties for tenure-track faculty members who are on sabbatical and other types of leave.

Non-tenure-track faculty may also be hired to bring specialized skills into the department. This is especially true in professional fields such as engineering, nursing, and business. Practitioners may not have the academic credentials necessary to be hired as a tenure-track faculty member. Thus, hiring the practitioner as a non-tenure-track faculty member allows the department to access the specialized skills without changing the criteria for tenure-track positions. Departments can hire a non-tenure-track faculty member to teach courses for which they have not been able to or have chosen not to recruit tenure-track faculty with that expertise.

Administrators report that non-tenure-track faculty are equally qualified to teach as their tenure-track counterparts and their positions allow them to focus on teaching and the scholarship of teaching (GAO, 2017). In the eyes of many administrators, non-tenure track faculty are very good, dedicated teachers who add value to curricula through their specialized knowledge and skills and whose presence adds security and flexibility to departmental plans (Hollenshead et al., 2007).

Jobs Satisfaction and Dissatisfaction

Administrators see full-time non-tenure-track engineering faculty members as valuable additions to the teaching faculty. Understanding the factors that create job

satisfaction and avoid job dissatisfaction can help programs develop policies that support and nurture non-tenure-track faculty.

Non-tenure-track faculty, both full-time and part-time, are motivated to teach because they like to teach and work with students, they enjoy academic freedom, and the ability to balance the demands of their careers with the demands of their private life (Waltman, 2012; AFT, 2010). These career satisfiers are similar to those experienced by tenure-track faculty.

Non-tenure-track faculty, both full-time and part-time, are dissatisfied by the lack of career advancement opportunities, career instability, and a lack of respect and inclusion (Waltman et al., 2012). Career instability has the obvious effect of increasing stress on the faculty member. Another, less obvious, disadvantage is the reluctance of the faculty member to formulate long-term plans since they may not be around to see the plan's fruition. Part-time non-tenure-track faculty who are employed on a semester-by-semester basis may not know until shortly before their course begins whether they will be teaching that semester. This uncertainty degrades commitment to the university (Waltman et al., 2012). Faculty working with high career instability may only partially commit to the university since the university will not fully commit to them. A lack of career advancement opportunities and clearly defined ranks is a dissatisfier for many non-tenure-track faculty (Ott & Cisneros, 2015). They have no clear path for advancement as opposed to tenure-track faculty positions where the process and criteria for advancement are generally clearer and well-defined (Gappa et al., 2007). Part-time non-tenure-track faculty struggle with a lack of access to departmental resources such as office space, materials, and staff support (Kezar, 2013). A significant job dissatisfier for

both full-time and part-time non-tenure-track faculty is a lack of respect and inclusion in their department.

Many non-tenure-track faculty experience dissonance between satisfaction with their career itself and dissatisfaction with the conditions in which they work. They are faced with the choice of making the best of their situation or leaving to find more satisfying conditions. Given the overall satisfaction with their career, it is likely that most will attempt to make the best of their situation (Levin & Shaker, 2011).

In the book *Rethinking Faculty Work*, Gappa reviewed prior studies regarding contributors to job satisfaction for faculty (Gappa et al., 2007). All faculty, including non-tenure-track faculty, require five essential elements to be satisfied in their work: employment equity, academic freedom and autonomy, flexibility, professional growth, and collegiality. These five elements surround a core value of respect. Gappa defines respect as the basic human valuing of people for who they are and for what they uniquely contribute to the organization.

Herzberg differentiates between job factors that motivate and satisfy versus job factors that simply diminish dissatisfaction (Herzberg, 1966). In Herzberg's framework, job satisfiers and dissatisfiers are not opposites, they are on separate dimensions. A study of the Baxter Healthcare Corporation conducted by Campbell and Koblenz (Campbell & Koblenz, 1997) found that employees considered some aspects of their work experience as entitlements and some as benefits. Feeling respected was considered by the employees to be an entitlement and was essential to satisfaction. Addressing work aspects that are considered entitlements, like respect, does not provide a positive return for the organization because the employee feels that the entitlement is owed to

them and is therefore not grateful for it (Gappa et al., 2007). Not addressing an entitlement, however, produces significant dissatisfaction resulting in higher turnover, apathy, and low productivity.

Applying the framework of entitlements and benefits to the academic setting, Gappa concludes that the five essential elements of job satisfaction are benefits while the core of respect is an entitlement. Without respect, the faculty member will not appreciate or value the five surrounding elements.

Seventy percent of administrators report that respect is an important job satisfaction factor for the non-tenure-track faculty in their department (Hollenshead et al., 2007). Non-tenure-track faculty have a dual identity and experience respect differently as a teacher than as a faculty member. In the classroom, they are often regarded as experts by the students who do not draw distinctions between them and the tenure-track faculty. In dealings with the tenure-track faculty, they are regarded as subordinate (Levin & Shaker, 2011). Disrespect and exclusion by their peers are major sources of job dissatisfaction for non-tenure-track faculty (Waltman et al., 2012). The most salient context for respect and inclusion is departmental culture.

Departmental Culture

Since the primary context for job satisfaction and dissatisfaction for non-tenure-track faculty is the department, understanding the culture within departments is important. Kezar studied departmental culture as experienced by non-tenure-track faculty and found four culture categories: destructive, neutral or indifferent, inclusive, and learning (Kezar, 2013). Destructive cultures are those in which non-tenure-track faculty members do not have access to the resources needed to perform their jobs,

experience disrespect and exclusion, and are hired haphazardly. This departmental culture is associated with poorer student outcomes for the non-tenure-track faculty member's course as the faculty member does not have the opportunity to perform and is less willing to perform at the level of a tenure-track faculty member (Blumberg & Pringle, 1982).

Most non-tenure-track faculty, particularly part-time non-tenure-track faculty, work in a neutral or "invisible" culture. In the neutral culture, the department provides the basic office supplies and staff support to conduct the assigned course. Space to hold office hours may be provided. Hiring is haphazard and the faculty member may be notified of the hiring decision and course assignment weeks before the course begins, leading to poor preparation and disorganization. Evaluation does not happen or is not taken seriously, limiting opportunity for self-improvement. Non-tenure-track faculty working in neutral cultures do not have significant relationships with tenure-track faculty. While they are not overtly disrespected, they are simply ignored.

Inclusive cultures welcome the non-tenure-track faculty into the department. Hiring is intentional and the faculty member is listed in departmental faculty listings as a faculty member. Respect and inclusion is perceived by the non-tenure-track faculty member and they have positive relationships with tenure-track faculty. Some professional development opportunities are provided. The resources and office space required to teach assigned courses and hold office hours are provided. Collaborative scheduling allows the non-tenure-track faculty member to plan course materials in advance, leading to better organization and more effective teaching. The non-tenure-track faculty member is invited to department meetings and may be allowed to vote.

Formal evaluation is not provided and leadership is not encouraged at this level. While the non-tenure-track faculty member may be allowed to choose the textbook, they do not choose the course topics or structure.

The learning culture invites the non-tenure-track faculty member to engage with curriculum and course development, provides the resources needed to teach effectively, values the contributions of non-tenure-track faculty, and uses hiring practices that ensure the faculty member has the skills necessary to be successful in the position. The faculty member can leverage career experience to develop new courses or to modify existing courses. They are encouraged to actively participate in departmental governance and committees. This departmental culture is associated with better student outcomes because the faculty member has the opportunity to perform and is more willing to perform in their role as teacher.

Different groups within a department may experience the same culture in different ways (Miller, 1992). It is possible for full-time non-tenure-track faculty to experience an inclusive departmental culture and the part-time non-tenure-track faculty in the same department to experience a neutral departmental culture.

Necessity of Qualitative Research Methods

Qualitative research methods provide an effective tool to understand culture. Researchers use qualitative research methods to understand complex social structures like the culture in university engineering programs (Borrego, Douglas, & Amelink, 2009, Seymour, 2000). In qualitative studies, data are collected via interviews, focus groups, and participant observations. The data provide a rich, thick description of the

phenomena under study, allowing the researcher to explore how and why complex social structures operate as they do.

Qualitative studies have been used to successfully study engineering programs, exploring the experiences and perspectives of students, faculty, and administrators (Foor et al., 2007; Trytten et al., 2012; Wendell, Wright, & Paugh 2017). Responding to open-ended questions, the participants describe experiences or beliefs that may not have been included in the research questions. Since participants are free to discuss topics and themes that are not limited to the research questions, issues that are significant to minority or marginalized groups can emerge. Issues that are important to marginalized groups are often invisible to those in the majority, including researchers (McIntosh, 1988). The participants are given a voice and, with careful data analysis, that voice and issues important to the participants are represented in the study findings. The use of direct quotes in qualitative studies allows the participant to speak directly to the reader. Qualitative research methods are an excellent choice to study non-tenure-track faculty because they are a marginalized class within engineering departments whose voices have only been heard through surrogates or framed through the majority lens.

The research on non-tenure-track faculty includes surprisingly few studies on what the non-tenure-track faculty themselves have to say (Hollenshead et al., 2007). This study intends to allow the non-tenure-track faculty to speak for themselves about where they've come from and where they're going. Qualitative research methods are necessary to understand the complex social structures in which non-tenure-track engineering faculty work.

Chapter 3: Methodology

Research Design

The epistemological stance of this study is constructivist and its theoretical perspective is phenomenographical (Crotty, 1998; Marton, 1986). The research design is an inductive, general qualitative design (Creswell, 2007; Walther et al., 2017). Sampling was purposive and criteria-based. Data were collected using semi-structured interviews, which were recorded and coded directly from audio using pre-coding with additional emergent codes (Pirie, 1997). Qualitative research methods such as the ones used in this study can provide significant results with small sample sizes (Lareau, 2003; Foor et al., 2007; Trytten et al.; 2012, Wendell et al. 2017).

A constructivist epistemology holds that we produce meaning and make sense of our world by applying significant symbols that are provided to us by our culture. It is impossible to separate measurements or observations from the culture in which those measurements or observations are made. We may experience phenomena directly, but we develop the meanings applied to those phenomena socially (Crotty, 1998). Constructivism holds that it is not only the objects and phenomena in our world that matter, but primarily the meanings that we construct from those objects and phenomena. This study involves culture and the meanings that the participants assign to aspects of their work lives. While we are interested in the specific details of their work, we are more interested in what the participants believe those details mean about themselves and their place in the university.

Phenomenography posits that we can study a phenomenon and our experience with it directly (Marton, 1986). The researcher attempts to explore the variety of ways

participants understand the phenomenon as experienced by the participant. Phenomenography encourages the researcher to explore the how the participant understands and thinks about the phenomenon itself without attempting to understand it *a priori* from existing theory or cultural beliefs. In this study, the phenomenon of interest is the experience of being a non-tenure-track engineering faculty member.

A qualitative inductive research design explores the beliefs and experiences of the participants by first collecting data through interviews or participant observation. The existing theory is a theoretical lens through which the collected data can be understood (Borrego et. al, 2009). Inductive research designs do not attempt to prove existing theories: they search for additional meaning, fleshing out existing theories. Inductive qualitative studies can generate significant meaning using limited sample sizes, sometimes using a single case. Looking through the eyes of the participants, researchers can understand not only the social structures in which the participants operate but also the effects of the culture upon them.

A strength of qualitative data analysis is the ability to discover unexpected themes in the data, leading to the exploration of issues that were not foreseen in the study design (Strauss & Corbin, 1990). In this study, emergent themes, such as the importance of respect, were identified during the coding phase and assigned new codes. As data analysis continued, the codes were compared, contrasted, and refined leading to the identification of data that may have otherwise been missed.

The findings of qualitative studies are transferable, meaning that the experience of the participants is likely to be similar and transferable to other persons who encounter the same phenomenon or a similar culture. For example, the study of a single student,

Inez, provides an exceptional view into engineering education culture as experienced by an economically disadvantaged, multi-minority, female, average-achieving engineering student (Foor et al., 2007). While the reader of the study is unlikely to know the individual participant described in the paper, they may know students who feel the same isolation and exclusion experienced by Inez. The results of the study are transferable because students who are similar to the participant in a similar culture are likely to have experiences and viewpoints similar to the participant. Readers can examine the findings and decide for themselves whether they explain or inform their own situation (Borrego et. al, 2009).

Sampling

This project intends to study typical full-time tenure-track faculty members teaching in engineering programs located in the United States. "Typical" in this context indicates that the sampling strategy is not attempting to select outliers or unusual cases. Sampling was purposeful and methodical (Creswell, 2007; Wendell et al., 2017) using criterion-based sampling. Criterion-based sampling is a purposeful sampling strategy in which predetermined criteria are used to select potential participants (Patton, 1990). Criterion-based sampling is appropriate for this study because it allows selection of candidates from specific types of institutions, disciplines, and program sizes. The predetermined criteria were 1) the participant's primary responsibilities are teaching in an engineering program situated within a public university with a Carnegie rating of R1, 2) the participant is not tenure-track, and 3) the participant is a full-time employee. The criteria of being a full-time non-tenure-track engineering faculty member follows from the research questions. The criteria of having a predominantly teaching focused

appointment in a public, R1 university were selected because most large engineering programs are situated in public, R1 universities. Private institutions or institutions of other Carnegie classifications have different expectations regarding teaching and research. While those programs are worthy of study, they are not the typical cases that this study intends to select.

One of the challenging aspects in studying non-tenure-track faculty is the lack of consistent data (Kezar & Maxey, 2012). This inconsistency stems from the variety of job titles given to non-tenure-track faculty and differences between institutions as to which non-tenure-track positions are faculty versus staff and which are primarily teaching-based versus research or service-based. Fortunately, the American Society for Engineering Education (ASEE) conducts an annual survey of engineering programs in the United States. Participation is voluntary and a wide variety of engineering programs choose to participate in the survey. Among other data, the survey collects information on the number of faculty in each participating engineering college that are tenured or tenure-track, full-time non-tenure-track, and part-time non-tenure track. Since the survey imposes a standard definition of non-tenure-track faculty and a standard definition of teaching faculty, it is a reasonable source of data from which to sample.

The ASEE survey defines tenure-track faculty as any faculty who teach undergraduate or graduate courses that are either tenured or tenure-track. Graduate teaching assistants, graduate research assistants, summer faculty, and adjunct faculty are not counted as tenure-track faculty. Non-tenure-track faculty includes faculty who teach graduate or undergraduate courses, including post-doctoral faculty and adjunct faculty. There is no minimum number of courses or credit hours specified for non-tenure-track

teaching faculty. Faculty that teach only during the summer, graduate research assistants, and graduate teaching assistants are not counted as non-tenure-track faculty. The ASEE survey guidelines do not specify a method for determining whether a faculty member is full-time or part-time, each program presumably applies the criteria their university uses to define full or part time employees. When the research began, the most recent survey data available was from the 2014 survey and so that survey was used to generate the initial list of programs from which to sample.

This study is interested in the experiences of non-tenure-track faculty members teaching in typical engineering programs in the United States. Many engineering programs are research intensive and offer doctoral degrees. Therefore, the initial criterion used to narrow the dataset was that the engineering program was part of a university with a Carnegie classification of R1. Four of the remaining engineering programs did not offer tenure, so those programs were excluded from further analysis. A sum of all tenure-track, full-time non-tenure-track, and part-time non-tenure-track faculty for the remaining programs was calculated by summing the data for all schools in the dataset. The proportion of full-time non-tenure-track faculty to all faculty was calculated to be 8.9%.

Using the same method, the proportion of full-time non-tenure-track faculty to all faculty was calculated for each program in the list. The list of programs was sorted by that proportion and a marker was placed at the row at which the proportion was equal to the national average. Programs around this marker have a proportion near the national average and therefore are programs with a typical proportion of full-time non-tenure-track faculty. Sampling began with these programs.

Beginning with the program with the proportion of non-tenure-track faculty nearest the national average, additional criteria were applied. If the program had ten faculty or more and was a public university, the program was added to the list of candidate programs. If the program had fewer than ten faculty or was not a public university, then the program was not added to the list of candidate programs. Engineering programs with fewer than ten engineering faculty were excluded because they likely contain only one non-tenure-track member and the size of the program made it atypical. Private universities were excluded because engineering programs in those colleges vary widely as opposed to those in public universities. Engineering programs with ten or more faculty situated within public, research intensive, doctoral-granting universities are likely to have similar requirements for tenure and similar faculty expectations for research, teaching, and service. The next program above the marker and the next program below the marker were then considered, continuing until eight programs had been identified as candidates. Later in the project, additional candidate programs would be required and this procedure was followed to select the additional candidate programs.

Each of the candidate programs had a public website which listed the engineering disciplines offered by that institution and all the candidate programs had electrical engineering programs. Given my professional training and experience as an electrical engineer and my role as the researcher I chose to focus on faculty from electrical engineering programs. This choice allowed me to more completely understand the nuances of the participant responses and to formulate better probing questions (Turner, 2010). Potential participants were identified by examining the title of each

faculty member on the public website. Any faculty member with a title that matched a standard title for tenure-track faculty, namely assistant professor, associate professor, or professor, was not chosen as a candidate. It is possible that some non-tenure-track faculty were excluded because their title matches a standard tenure-track title. Any faculty member whose title did not match one of those three titles was added to the list of potential participants and their name, email address, and title were recorded. This first round of participant sampling resulted in thirty-one potential participants.

Recruitment Process

A recruitment email, which can be found in Appendix A, was sent to each potential participant at the email address listed on the departmental website. The recruitment email was the same for each participant. Since the recruitment email had been previously approved by the University of Oklahoma Institutional Review Board (IRB), no variation in the recruitment email was possible except for the salutation. During the first round of thirty-one recruitment emails, the salutation had the prefix Dr. or Mr./Ms. depending on the academic background of the candidate. In cases where it was not possible to distinguish whether the candidate had earned a doctoral degree, the prefix Dr. was used. In subsequent rounds of recruitment, the prefix Professor was used for all recruitment emails.

The recruitment email gave some background information on the interviewer, explained the motivation for the research, provided information about the interview, and offered twenty dollars in compensation for participating in the interview. From these thirty-one recruitment emails, eight participants enrolled in the study.

To recruit two additional participants, for a total of ten participants, three additional candidate programs were identified and eight additional recruitment emails were sent to potential participants. The first two candidates to respond were enrolled in the study. Overall, ten participants from eight engineering programs were enrolled in the study.

For the second set of interviews, recruitment emails were sent to the ten participants from the first set of interviews. Seven of those participants elected to participate in the second interview. Three additional participants were recruited by repeating the sampling and recruitment process described above until three additional participants were identified for a total of ten participants. With this sampling size, the interview data appears to have reached saturation with no new themes occurring in the last three interviews (Charmaz, 2014).

Consent Process and Interview Preparation

All communication with participants prior to the interview was conducted via email. Each participant was sent a consent document and a copy of the interview questions at least two days before the interview. Sending the interview questions in advance gave each participant time to reflect on the questions. Some participants used the questions to become better prepared for the interview. In one case, a participant had researched aspects of the questions that they were not familiar with, for example, the career advancement opportunities available to them at their university.

Once the consent document was completed and signed, the interviewer and participant agreed upon a time and contact number for the interview. The participant was given the choice between being interviewed using video and audio, or being

interviewed using audio only. All participants chose to be interviewed via the telephone, audio only.

Interview Process

At the previously agreed time, the interviewer initiated a telephone call to the participant using the contact number provided by the participant. Allowing the participant to choose the contact number allowed the participant to be interviewed in the location of their choice. Both sets of interviews were semi-structured and the interviewer asked the questions in the order listed in the interview protocol. The interview protocols for both sets of interviews can be found in Appendix B. Depending on the participant's answers, the interviewer asked clarifying and probing questions. Occasionally, the participant would answer a question that would be asked later in the interview. In that case, the interviewer would read the question and then ask the participant if they had anything further to add to their response. The audio responses were recorded and archived for later analysis. In both sets of interviews, the data from all ten interviews were collected before data analysis began.

Data Analysis

The interview data were analyzed using qualitative analysis software, NVivo version 11. NVivo allows coding of audio data directly, so transcription is not necessary, saving hours of transcription per interview. Direct coding of the audio is not only more efficient, but also allows the researcher to hear non-verbal data like pauses, inflection, pitch, rate, and volume in the data.

The initial code set was developed from the research questions and additional emergent codes were added during data analysis. As the data were analyzed, emergent

codes were checked and modified to incorporate the new data using constant comparative analysis (Charmaz, 2014). NVivo allows audio data to be tagged with researcher-defined codes, allowing the researcher to listen to audio from all participants who provided data matching that code. The coding was not systematically reviewed or corroborated by anyone else.

After analyzing the interview data, themes were identified. Most themes corresponded to aspects of the research questions but additional themes emerged, most notably a strong theme of respect and inclusion.

The results of this analysis resulted in three papers, one that has been published, one that is accepted for publication, and a third which will be submitted shortly. The first paper addresses the first two research questions on the career pathways of full-time, non-tenure-track engineering faculty. The second paper addresses the last three research questions on career goals of full-time, non-tenure-track faculty. These papers correspond to the two main data collection efforts. The final paper is about respect and inclusion for full-time, non-tenure-track faculty, a theme that emerged from data collected for the previous papers. These papers are presented as the next three chapters of the dissertation.

Chapter 4: The Career Pathways of Full-Time Non-Tenure-Track Engineering Faculty

Author's Note: This paper has been accepted for publication in the Proceedings of the 2018 ASEE Annual Conference. The citation format was changed to maintain consistency with the rest of this document. The author of this dissertation wrote the paper in collaboration with his advisors, Dr. Deborah Trytten and Dr. Randa Shehab.

Introduction and Literature Review

A significant and growing portion of faculty members who teach in universities in the United States are in appointments that do not offer tenure. These appointments are sometimes referred to as contingent or non-tenure-track appointments. Using data from the Integrated Postsecondary Education Data System (IPEDS), the Government Accounting Office (GAO) estimates that in 2015 the percentage of all faculty members teaching at four-year institutions in the U.S., including part-time, in non-tenure-track appointments was 61% (GAO, 2017). Considering only full-time positions at four-year universities, the percentage of non-tenure-track appointments was 34%. Data from the 2014 ASEE survey of engineering programs in the United States shows that the percentage of non-tenure-track appointments in engineering departments is 8.9% (ASEE, 2014).

Non-tenure-track appointments are growing much faster than tenure-track appointments. From 1995 to 2011, the number of tenure-track positions increased by 9.6% while the number of non-tenure-track full-time positions increased by 109.2% (GAO, 2017). The reasons for this increase in non-tenure-track faculty include budget constraints, the need for additional flexibility in scheduling, and the ability to include

faculty members with specific knowledge or expertise for specific courses (GAO, 2017; Hollenshead et al., 2007), factors which are not likely to abate.

As the number of non-tenure-track faculty increases, concerns about the impact of this change on student learning and as an attack on the tenure system have emerged. As Levin and Shaker note, "full-time non-tenure-track faculty are deemed accomplices, albeit unwitting, to the erosion of the academic profession, faculty power, and undergraduate education" (Levin & Shaker, 2011). Early quantitative studies supported this notion, using large national datasets to show that non-tenure-track faculty, especially part-time faculty, are less likely to engage students, spend less time preparing for courses, are less likely to use active and engaging teaching techniques, had lower academic expectations for their students, and were less productive in both teaching and research (Umbach, 2007; Bland et al., 2006). At that time, it was not clear whether the effects were caused by the non-tenure-track faculty themselves or the structure in which the non-tenure-track faculty operate.

Kezar and Sam (Kezar & Sam, 2011) suggested that new theoretical models are necessary to understand non-tenure-track faculty and proposed that some earlier studies had used theoretical models that did not fit non-tenure-track faculty and were derived from a deficit model based on the preconceived notions of the researchers (Kezar & Sam, 2011). For example, in a study of non-tenure-track effectiveness, one measured aspect of non-class student-faculty interaction was how many hours per week faculty spent supervising undergraduate student research. Supervising research is an activity that tenure-track faculty are likely to perform but is not in the job description of most non-tenure-track faculty. In that study, the list of measured faculty activities was

generated by examining the daily work of tenure-track faculty. Activities that are typically performed by non-tenure-track faculty alone would not have made it onto the list of measurements. Levin and Shaker noted that the study of non-tenure-track faculty often does not include the perspective of the non-tenure-track faculty themselves, leading to an incomplete understanding of the professional identity of non-tenure-track faculty and perpetuating a misunderstanding of faculty life (Levin & Shaker, 2011). It is important to hear from non-tenure-track faculty themselves, to find out what the non-tenure-track faculty want and what job issues they perceive to be the most important (Hollenshead et al., 2007). This study explores the experience of engineering faculty while most studies have included faculty from a broad range of disciplines, noting that faculty from engineering and business programs are likely to have a different experience because of their professional careers.

The varied career and academic experience of non-tenure-track faculty increases the diversity of engineering programs by providing perspectives and values that may be different from those of the tenure-track faculty. The ASEE statement on diversity asserts that:

> ASEE strongly believes that all must be provided with equality of opportunity to pursue and advance in engineering careers and that no individual should experience marginalization or non-inclusiveness of their contributions or talents because of visible or invisible differences (ASEE, 2016).

Non-tenure-track faculty have "invisible differences" in their career and academic experience when comparted to their tenure-track counterparts. These invisible differences contribute to their marginalization and exclusion and subject them to policies that are explicitly biased against them (Fitzmorris, Shehab, & Trytten, 2016).

This marginalization and exclusion impedes the ability of non-tenure-track faculty to perform in their teaching roles (Kezar, 2013).

This study explores the experience of full-time non-tenure-track engineering faculty by listening to the faculty themselves. We explore the previous career and academic experience of each participant. We explore the hiring process to see if it is formal and tailored to the needs of the program. A formal hiring process can increase the effectiveness of the faculty member and improve student outcomes (Kezar, 2013). We explore the motivation of each participant to teach to see if full-time engineering non-tenure-track faculty share the same motivations found in prior research which are a desire to work with students and to achieve a better work/life balance (Hollenshead et al., 2007; Waltman et al., 2012).

Our research questions are:

1. What are the career pathways to becoming a full-time non-tenure-track engineering faculty member?
2. What factors, if any, do non-tenure-track faculty believe motivate them to teach?

This study explores the experience of full-time non-tenure-track engineering faculty by listening to the faculty themselves. We explore the previous career and academic experience of each participant. We explore the hiring process to see if it is formal and tailored to the needs of the program. A formal hiring process can increase the effectiveness of the faculty member and improve student outcomes (Kezar, 2013). We explore the motivation of each participant to teach to see if full-time engineering non-tenure-track faculty share the same motivations found in prior research which are a

desire to work with students and to achieve a better work/life balance (Hollenshead et al., 2007; Waltman et al., 2012).

Definition of Terms

In this study, faculty members who are in appointments that offer tenure are referred to as tenure-track whether they are tenured or pre-tenure. Faculty who are in appointments that do not offer tenure are labeled non-tenure-track. The label non-tenure-track, when used alone, denotes faculty members who are either part-time or full-time and are not graduate students. Whether full-time or part-time, the faculty member's primary responsibility is teaching, which excludes faculty members whose primary responsibility is research. The label full-time is used to describe faculty members who are considered full-time employees by their institution. The criteria for being considered full-time varies by institution. The label part-time refers to faculty members who are not considered full-time by their institution. In this study, the term adjunct is a synonym for part-time non-tenure-track faculty.

Engineers who perform engineering work outside academia, usually for corporations or governmental agencies, are referred to as "practicing engineers" or "engineering professionals". These labels are not intended to imply that engineers working in academia are neither professional nor non-practicing.

Methodology

This study is a general qualitative study using a criteria-based sampling strategy and a semi-structured interview for data collection (Creswell, 2007).

Sampling

For this study, we are interested in the experiences of typical full-time non-tenure-track engineering faculty members and so we designed our sampling criteria to select typical cases (Creswell, 2007). We first used the American Society of Engineering Education data mining tool to determine the national average of full-time non-tenure-track faculty members as a percentage of all full-time faculty members (ASEE, 2014). We wanted participants in the study to be typical non-tenure-track full-time engineering faculty working in US research universities. Our sample set began with engineering programs at universities with a R1 Carnegie rating. From that set, we selected electrical engineering programs that had at least ten full-time faculty members. We chose electrical engineering departments because every engineering college that matched our criteria has an electrical engineering department and the author who conducted the interviews (Fitzmorris) is an electrical engineer and thus could more completely interpret the nuances of the responses in discipline-specific discussions. We sorted the programs using the percentage of full-time faculty that are non-tenure-track. From that sorted list, we selected universities whose percentage of full-time non-tenure-track faculty was near the national average.

Ten members of this population were included in an earlier study on the career goals of full-time non-tenure-track engineering faculty members, so we attempted to recruit the same ten participants. Seven of the ten agreed to participate in this study. We recruited the remaining three participants by selecting two additional engineering departments that fit our sampling criteria and sending recruitment emails to all faculty members in those departments with the words instructor, lecturer, teaching, or practice

in their titles. Overall, we sent nineteen recruitment emails and enrolled ten participants from eight universities.

Data Collection

We collected data using a semi-structured interview of seventeen questions. The interview was intended to last forty-five minutes although the participants were encouraged to elucidate their answers and the use of probing questions added to the interview times (Turner, 2010). The shortest interview was thirty-five minutes and the longest interview was fifty-eight minutes. We provided the participants with the interview questions several days in advance to allow them to reflect upon the questions.

Data Analysis

The interviews were audio-only, conducted via telephone, and recorded for later analysis. The audio data were coded directly without transcription using qualitative analysis software (NVivo 11) with an initial code set that had been developed from the research questions and the interview questions. The code set contained twenty-two codes with four codes added as emergent codes during the coding process. One author (Fitzmorris) conducted the interviews and coded the interview data. Once the data were coded, all three authors listened to selected interview segments, discussed the initial findings, and evaluated emergent codes. Collaboration between the three authors during data analysis improves the reliability of this study by providing a diversity of perspectives. One author is a full-time non-tenure-track faculty member, one author is a tenured faculty member, and the third author is a tenured faculty in an administrative position.

Nine of our participants are male and one is female. This gender imbalance is typical of electrical engineering faculty. While qualitative research methods sometimes generate meaning from a single case, the research team did not feel that this single participant's perspective was sufficient to address the role of gender in the lived experiences of full-time non-tenure-track faculty. This is unsurprising since analyzing the role of gender in full-time non-tenure-track faculty was not a research goal of this study and no questions were asked that related to gender, ethnicity, socio-economic status, or other elements of social identity.

Direct quotes from the interviews appear later in this paper and appear in italics. Interview data that appear within square brackets [ ] are clarifying remarks made by the authors. Interview data that appears within curly braces { } are details that have been removed to protect the identity of the participant.

Subjectivity Statement

The author who performed the interviews and data analysis is a full-time non-tenure-track electrical engineering faculty member and so was able to understand the nuances of the participants' responses without needing to clarify technical details about particular courses or career experience described by the participant. While conducting the interview, he attempted to maintain a neutral posture but his background may have influenced the probing questions that he chose to ask and the topics that he chose to clarify. During data analysis, he was especially careful not to project his personal feelings onto the data and to accurately portray the views of the participants to the best of his abilities. Once the data were coded, all three authors met to listen to the coded audio data, identify emergent codes, and to discuss the findings. The three authors have

different academic roles (full-time non-tenure-track faculty, tenured faculty, and administration) which strengthened the data analysis.

Results

The interviews with each participant discussed their pathway leading into the full-time non-tenure-track faculty position. Interview questions also asked participants to reflect on their motivations and expectations for this career track.

Significant Professional Experience

Our first research question explores the career pathways that our participants experienced on their way to becoming full-time non-tenure-track engineering faculty. One aspect of that pathway is prior professional experience.

We found that seven of our participants had significant professional experience as shown in the following list:

Alan: 7 years engineering

Brandon: No engineering experience

Cody: 40 years engineering

Darrell: 10 years engineering

Ethan: 35 years engineering and military

Frank: 7 years engineering

Greg: 21 years engineering

Henry: No professional experience

James: No engineering experience

Kimberly: 8 years, engineering

Four of the participants rose to positions of influence in their organizations before leaving to become faculty members. Alan was the senior engineering manager, reporting directly to the CEO of his company. Cody was a senior developer in charge of overseeing the team of engineers on his projects. Ethan was a division manager at a prestigious laboratory after completing his career in the military. Greg was the director of engineering at his company before retiring.

Henry began his teaching career immediately after earning his master's degree in computer science. James had a particularly unique path, working in non-engineering related fields before earning his engineering degree, working in a research lab, and finally transitioning to a full-time teaching position. After earning his MS in electrical engineering, Brandon postponed his engineering career for professional athletics.

Most of these participants have significant experience in the practice of engineering, half of them with engineering management experience.

Diversity of Academic Experience

Another aspect of our first research question exploring career pathways is the academic experience of our participants. We found a remarkable diversity of academic experience.

All ten of our participants earned master's degrees in electrical engineering or computer science. Eight of the participants earned their master's degrees while attending university full-time. Darrell and Greg earned their master's degrees while working in industry. Five participants have doctoral degrees in engineering: Cody, Darrell, Ethan, Greg, and Kimberly. Darrell, Ethan, and Kimberly earned their degree while attending university full-time while Cody and Greg earned their degree while

working at engineering firms. Both Darrell and Ethan began teaching at the same institution immediately after earning their doctoral degree, Kimberly earned her doctoral degree, then worked for eight years at a national laboratory before returning to the university to teach full-time. The five participants who have doctoral degrees also have the most extensive engineering experience.

Five participants, Alan, Brandon, Ethan, Henry, and Kimberly, who had received a degree from the department in which they teach, described how some of the faculty members in their department seemed at times to consider them as graduate students or as subordinate faculty. This was not usually overt, but was communicated in subtle ways. The participant who struggled with this issue the most was Henry, who began teaching as a graduate teaching assistant and then transitioned into a full-time teaching position. While he is widely regarded by the students and other faculty as an excellent teacher, he describes his status in the department as in a gray area between a graduate student and faculty and has had to take steps to be recognized as a faculty member within the department.

> I: Once you started teaching full-time in Spring/Fall, how was it determined what you'd be teaching and did you have the resources you needed to teach those courses?
>
> P: The first couple of semesters I was full time were annoying because I was treated as a Graduate Teaching Assistant (GTA), even though I wasn't. My hiring was done through the GTA program coordinator rather than being hired by the department chair like the other lecturers. During that time, I was also teaching an intro-level class which is a class that is exclusively taught by GTAs. It was very second-class for a while. After I started teaching more regular, required classes in the Fall/Spring, it still took a year or two before I started getting hired through the department chair and stopped being treated like a GTA.
>
> I: So that took some time. Do you know why that shift happened?

> P: I complained about it. I have a good relationship with the graduate program coordinator and I told her that I didn't understand why I was being hired through her, I'm not a GTA. That led to them acknowledging that I needed to be treated like the other lecturers.

Cody, Darrell, Frank, and Greg had significant industry experience and did not receive a degree from the department in which they taught said this was not a significant issue. While they may not have the same status in the department as the tenure-track faculty, they are considered part of the faculty.

Two participants expressed frustration regarding the need to pursue a doctoral degree in engineering in order to advance in their academic career. Alan noted that he is interested in pursuing a doctoral degree in engineering education, but that degree is not offered at his university and pursuing a degree in education would not suffice for promotion in his department.

> I would argue that maybe it is appropriate that you need a PhD for that level, but let's clarify that. A PhD in [specific technical field] which is what my Master's degree in, is not going to help me in any way. That should not count towards the promotion. But something along the lines of educational psychology or engineering education, one of those PhDs where the focus of the research is improving pedagogy. That has merit, but in my department, that PhD would be counted as less valuable than a more technical degree.

Henry is interested in engineering education but is absolutely not interested in pursuing a doctoral degree in computer science saying "Doing research would take me out of the classroom and away from students, why would I want to do that?"

Finding the Position

A third aspect of exploring the career pathways of full-time non-tenure-track engineering faculty is the process by which the participants found their first teaching assignment. Kezar found that a formal hiring process in which candidates are recruited

based on the needs of the department has a positive effect on student learning (Kezar, 2013). Most of our participants were not recruited in that manner.

By far, the most common way our participants found their teaching position was by encountering a member of the administration, usually a department head, who had their eye out for a non-tenure-track faculty member. Seven participants found their position in this manner. We did not interview members of the administration so we don't know how long they had been looking or what criteria were used to choose the faculty, but we do know the process was informal and did not involve other faculty members in the department. Alan, Darrell, Ethan, and Henry were all offered full-time positions immediately following their thesis or dissertation defenses. Brandon was invited to give a talk on leadership and motivation which was attended by a dean who offered him a full-time position. Cody and Greg were interested in retiring from their industry positions and teaching full-time, inquired about full-time positions, and were directly hired by the department head.

Greg describes his experience:

> P: I went down to the university because they are always looking for researchers. I had my PhD but didn't know much about different academic positions.
>
> I: So they were looking for tenure-track faculty?
>
> P: Right, they were looking for tenure-track people with the ability to get money from grants and all that. The guy they directed me to who was in charge of the first-level of hiring there at that time was a little bit of a jokester. He pointed to a stack of resumes that was about three feet tall and said, "Those are the qualified people. You are not."
>
> I: Oh! Wow! [Both laugh]
>
> P: And then he said, "But if you want to teach, that's not a problem". What they wanted for teaching was someone to take over Senior Design, their Capstone course. They looked at my resume and saw twenty-five years of manufacturing

> experience which was real-life experience compared to the tenure-track people they had who had spent their lives in academia. They thought it fit extremely well and so I was offered a position on the spot.

Only two participants found their position as part of a search process. Frank was looking for a full-time teaching position and responded to nation-wide job listing. Kimberly was hired as part of a formal search process.

Eight of our ten participants found full-time teaching careers in the city where they lived. Frank and James relocated.

We found that the hiring process for most of our participants was informal, the decision was quick, and the people who made the decision were the department head and dean. Most of our participants found their teaching position in the city where they lived and worked.

Salary Determination

A fourth aspect of our first research question, exploring the career pathways into full-time non-tenure-track engineering faculty position, is the process by which the salary was determined for these participants. Prior research has indicated the department head plays a critical role in the life of non-tenure-track faculty because the department head has significant influence in decisions regarding contract renewal, departmental responsibilities, and salary (Gappa & Leslie, 1993). We found that as predicted, the department head had the largest role in determining starting salary.

Two participants, Cody and Darrell, negotiated their initial salary with the department head. Darrell described his experience as typical of a salary negotiation that he experienced in industry. The other participant who negotiated, Cody, made a single counter-offer that was 25% higher and the counteroffer was accepted by the department head. Eight of the participants did not negotiate their starting salary. Alan, Ethan,

Henry, and James did not have the option to negotiate because the salary was set by the institution for that position. Brandon, Frank, Greg, and Kimberly chose not to negotiate because the salary offered by the department was acceptable to them. Five of the participants, Alan, Cody, Ethan, Greg, and Kimberly reported that they took a substantial pay cut when moving from industry to the teaching position, but that salary was not the primary motivator in their career switch.

Ethan and James were unhappy with how the salary determination was handled. James felt his current department had unethically gained information about his previous salary. Ethan describes a different frustration with his salary determination:

> I: How did the department decide, and who decided, what your salary would be?
>
> P: There was a range that they had established for these three positions. These were all PhD lecturer positions and the only consideration in changing the salary was time-since-PhD. I talked with the chair at the time and said, "You know, I have thirty-five years engineering experience and that doesn't count for anything." He agreed that the only thing the university would consider was time-since-PhD. I'm not in it for the money, but that rankles me a little bit.

We found that as would be expected, the department head is the most important person in the full-time non-tenure-track faculty's salary determination. Many of our participants took a significant cut in salary when accepting their teaching position. We found one departmental policy that was biased against faculty members whose career paths included substantial professional experience, which undoubtedly improved their engineering practice, before earning their doctoral degree.

Resources and Responsibilities

One aspect of a departmental culture that encourages the success of all faculty members, including non-tenure-track faculty members, is having the resources

necessary to perform their duties adequately (Kezar, 2013). We asked our participants whether they felt the resources provided by their organization were sufficient.

The process of getting an office, the resources needed to teach their classes, and staff support were satisfactory to all ten participants. It was widely reported to be similar to the resources provided to other new faculty in their department. Adjunct faculty often do not receive this same level of support, so it is interesting that full-time non-tenure-track faculty do. Seven of the ten participants Alan, Brandon, Cody, Darrell, Ethan, Henry, and Kimberly, already knew faculty members or the department head before joining the department, so they had contacts in the department that could help them obtain the resources that they needed to get started.

Most of the participants taught three courses per semester which is considered a full load for teaching faculty at their university. Darrell teaches one course only but is responsible for developing and maintaining the laboratory course material that is a component of several lecture courses. Kimberly teaches two courses but has the additional responsibility of mentoring senior design teams.

We found that our participants had the resources they needed to do their jobs, which has been shown to improve student outcomes (Kezar, 2013).

Value of Career Diversity and Industry Experience

Five participants, Alan, Ethan, Greg, James, and Kimberly, teach capstone or senior design courses and they believe their industry experience and contacts have been invaluable. Alan says that he strives to make his capstone course as similar to his industry experience as possible. Alan, Ethan, and Greg were in engineering management before starting their teaching career and feel especially well prepared to

teach the communication and project management skills that are a component of those courses.

Five of the participants, Cody, Darrell, Ethan, James, and Kimberly, reported that when they teach a course that is related to their industry experience, the practical examples and stories from their career about the topic are especially effective teaching tools and they get positive feedback on their student evaluations about that technique.

Ethan described his use of examples and stories in the classroom:

> When I teach, what I try to do is to say "Why is this important, where would you use this concept?" and having had many opportunities at {prestigious laboratory} to apply a lot of the things I teach and also in the {military branch}, I can give them a lot of real-life, why-you-should-care examples about the topic. They seem to like that.

Darrell explains how his industry career helps inform his teaching:

> [Career experience] is invaluable for the classes that it applies to. So when I teach a subject that I have industry experience in, I can make absolutely exceptional examples and tell stories about why you need to learn this stuff. Students latch onto that. Examples from the field, personal experience, are way more convincing than general examples. It's just a better story.

Frank contributes to his program by developing a course and a lab for a specific technology that did not previously exist in the curriculum. He reported that local industry has found the course valuable and he believes the new course is uniquely preparing his students for careers in that branch of engineering.

Greg had a career in manufacturing and brings advanced manufacturing techniques into the department, allowing students to build systems that were not previously possible and collaborating with researchers in the department.

Capstone and introductory courses seem to be particularly well-suited for teaching faculty. Capstone is a particularly good fit for participants like Alan and Greg who had engineering management experience and so could model the type of design

processes and skills that are necessary in a product development career. Alan explained how his experience in engineering management helps his senior design course:

> I treat senior design almost exactly like I treated my employees when I was in industry. I run senior design as if it was a company. I'm the project manager for the company and each team is working on a separate project for the company. I don't think that's a particularly unique approach, but with that mindset, I can use everything that I had successfully developed in industry. The reporting is for the most part the same with a few tweaks for the educational environment. Honestly, it's not something I had to sit down and put a lot of thought into, it was just a natural fit.

Communication, budgeting, scheduling, and project management skills that participants developed in industry are especially valuable in capstone courses that use industry-sponsored projects. Their contacts and experience in industry help them locate new projects and determine whether those projects are the right scope for the capstone course. Capstone or senior design courses seem to be a good fit for teaching faculty with engineering management experience.

Introductory courses are also a good fit for teaching faculty. Cody and Henry teach large introductory courses. They feel that they are particularly good at teaching those courses because they are intrinsically motivated to teach, like working with the students, and feel that they have a natural ability to explain complicated subjects in an accessible way. Cody explains how his industry experience helps him relate to students in his large introduction to programming course:

> I've been doing this as a career for a long time, so I've made all the mistakes that they make. I know how it feels to make those mistakes and I know how it feels to get something working. It's been a huge exercise in drawing on my own personal experience. It gives me a lot of credibility in the classroom with the students. I get innumerable students say on their course feedback at the end of the semester, "{Cody} is a powerful professor because he has so much experience to draw on."

Three participants, Cody, Ethan, and Kimberly, described how their experience in industry allows them to bring stories and examples into the course. They describe how the examples demonstrate the importance of the topic and increase the students' motivation to learn the material.

Participants who worked as product development engineers were a good fit for upper-level courses in subjects that they were proficient in during their industry career. Kimberly worked for eight years as an engineer at a prestigious laboratory and is especially well suited to teach upper-level courses in electronics. Frank worked as a radio-frequency design engineer for ten years and is especially well-suited for teaching upper-level radio frequency and communication courses. Departments could use teaching faculty with significant development experience to quickly bolster their program in areas where more courses are needed but more research faculty are not.

We found that the diverse career experience among our participants was an asset to their departments and they believe their experience provides unique perspectives and experience that enrich their courses.

Self-Reported Motivation to Teach

Our second research question explores the factors that full-time non-tenure-track engineering faculty believe motivate them to teach. Studies of non-tenure-track faculty from all disciplines have shown that non-tenure-track faculty are motivated to teach by interaction with students, the classroom environment, and the ability to strike a satisfactory balance between work and personal responsibilities. We asked our participants what motivated them to pursue a teaching career.

Eight of the ten participants, Alan, Brandon, Cody, Darrell, Ethan, Frank, Greg, and Henry said that they were looking forward to interacting with the students and to be able to focus on teaching without competing priorities. Darrell, who had worked in a corporate R&D organization for ten years, explained how he was looking forward to teaching and interacting with the students:

> I've done a lot of R&D, research and development, and I wasn't that excited about having to chase grants and work on research-oriented projects. I wanted to be with the students. That's the number one thing I was looking forward to, primarily a teaching position versus research responsibilities.

Alan, Cody, and Henry felt that they have a natural talent for teaching, for breaking down complex topics and explaining them and so teaching engineering was the career that fit them best. Henry enjoys the process of teaching and feels that he is good at it:

> I enjoy explaining things and that follows me outside of the classroom. I just intrinsically enjoy explaining things and helping people understand things.

Greg felt that his career as an engineering director at a manufacturing firm had become too removed from the hands-on engineering work that he loved and a teaching position would allow him the creative freedom to build hardware and to teach students to do the same.

> This job allows me to explore. If I wanted to build a project with a processor, I can just do it. There's enough time for me to actually build stuff. My office has wonderful resources in terms of equipment to put things together, I've got enough funding for parts. Now I've got the time to actually build things and the things I build for fun end up attracting students because it's always blinking or moving.

One participant had been in an industry position that required extensive travel and was becoming increasingly busy. A teaching position provides a balance between work and family that the participant found more suitable.

We found that engineering full-time non-tenure-track faculty are motivated by the same factors that motivate non-tenure-track faculty from other disciplines: the opportunity to teach, work with students, and to find a satisfactory balance between work and personal life (GAO, 2017; Hollenshead et al., 2007; Waltman et al., 2012).

Career Satisfaction and Dissatisfaction

Studies of non-tenure-track faculty of all disciplines have shown a high level of career satisfaction (GAO, 2017; Waltman et al., 2012). We asked our participants if they had considered leaving teaching and if so, where they would go.

All ten of the participants are satisfied with their teaching career. Six of the participants, Brandon, Darrell, Ethan, Greg, Henry, James, and Kimberly reported that they have had no serious thoughts about leaving their teaching career. Alan, Frank, and James have thought about changing at times but have no immediate plans. Cody was in the process of transitioning from a full-time non-tenure-track teaching position to a full-time non-tenure-track research position because he would like to travel more than the university class schedule permits. Of the six participants who have not considered leaving their teaching position, two participants gave the reason that their full-time non-tenure-track position allowed them to focus on teaching while still affording them the option of doing research or consulting to the extent that they choose. Another two of the six participants who have not considered leaving feel like teaching is the career option that fits them best and there are no other career paths that they would enjoy more. The final two had long, successful careers in industry and although there are opportunities to return to industry, they enjoy interacting with the students and the university environment.

The three participants who have considered leaving would return to industry. One participant who is generally satisfied with his position does sometimes think about leaving when he is dissatisfied with his status in the department.

> I was the program manager and built an entire microelectronics division for a company, and from that to upper-level management for a consulting company. I reported to the president and had many subordinates. Now, I'm the lowest guy here and there's no real chance for advancement or promotion, that's not entirely true, but the promotions are pretty minor. So am I going to spend the rest of my career as the lackey when I started my career as "the guy"? That's a little hard on the ego.

Several participants described aspects of what Kezar calls a "learning culture" in which the departmental culture encourages the faculty member to improve the program, using their skills and expertise to create new learning experiences for students (Kezar, 2013). Frank developed a lab and course based on his experience in designing radio frequency circuits which he considered the most valuable and satisfying contribution to his department. James developed an electric vehicle competition team which was based on his career experience and was an extremely satisfying part of his career. Greg used his years of manufacturing experience to develop the manufacturing capability of his department, allowing the students to build systems using 3D printing, cabling, and circuit boards that they could not have built before. Aligning the responsibilities of teaching faculty with their career experience and giving them the resources necessary to make changes to the curriculum and the facilities leads to greater satisfaction for the faculty member and enriches the undergraduate student experience.

Discussion of Results

The Diversity of Non-Tenure-Track Career Paths

Our first research question is "What was the pathway for these participants in becoming full-time non-tenure-track engineering faculty members?" We found a

remarkably diverse set of pathways that provided our participants with a rich set of skills, perspectives, and experiences that they believe enrich their classes. Some participants started teaching right away, some after years or decades of industry experience. Some participants earned a doctoral degree early in their career, some much later, some do not plan on earning a doctoral degree at all. This breadth of pathways is important when considering recruitment and career advancement policies. A "one size fits all" approach to recruitment, especially if that approach is modeled on the tenure-track recruitment criteria, will result in policies that exclude some candidates whose perspectives and experiences would be an asset to the program. There was no career pathway that could be described as "typical" among these ten participants.

We found that our participants were hired with an informal process, most of them serendipitously. Of the ten participants in this study, seven found their initial teaching position by knowing the department head or faculty members in the department where they began teaching. There are positive aspects to this approach in that the department is hiring a person whose capabilities and strengths are known and who already have a set of contacts within the department who can help them become integrated into the department in their new role. There are negative consequences to informal hiring processes that should be considered. If the pool of candidates for a position is limited to the people known by the department head or the faculty, then many qualified and motivated people who may be more suitable for the position are not being considered. Performing a wide and methodical search for full-time non-tenure-track candidates would encourage departments to consider exactly what the role of the new faculty member would be in the department and then search for a candidate who

possesses the skills to be successful in that role. In other words, it would be beneficial to see the same attention and effort applied to hiring full-time non-tenure-track faculty that is applied to tenure-track faculty.

Self-Reported Motivation to Teach

Our second research question explored the participants' motivation to teach. Our findings regarding motivation confirm prior research on full-time non-tenure-track faculty in other disciplines. Our participants were motivated to teach because they enjoy interaction with students and the ability to forge a satisfactory balance between work and personal responsibilities (GAO, 2017; Waltman et al., 2012).

These participants felt most satisfied with their work when they were engaged with students, teaching them skills and knowledge about the topics in which they had significant experience which is expected (Hollenshead et al., 2007; Waltman et al., 2012). Participants find satisfaction in developing new courses, new laboratories, and new manufacturing capabilities.

We found a high level of career satisfaction among our participants, consistent with the satisfaction levels of non-tenure-track faculty of other disciplines. Nine of the ten participants have no plans to leave teaching. Three of those nine have considered leaving, not because of the teaching itself but because they are dissatisfied with their status and opportunities for advancement.

Conclusion

Non-tenure-track faculty are an increasingly large part of the faculty population at institutions of higher education. The factors that have led to the increase in the non-tenure-track faculty ranks are widespread and unlikely to change in the coming years.

Increasing the understanding of non-tenure-track engineering faculty careers and motivations can help institutions learn how to use this valuable new resource to make their educational programs improve.

We found a remarkable career path diversity among our participants. This diversity is a strength, bringing new perspectives, skills, and experience into engineering programs.

This remarkable diversity has two significant implications for departmental policies, one regarding recruitment and one regarding career advancement.

Latent Danger in Formalizing the Search Process

Previous research has shown that the recruitment of full-time non-tenure-track faculty should be undertaken with care, ensuring that the skills and perspectives that the new faculty member brings to the department complement the existing faculty (Kezar, 2013). This careful hiring did not happen for most of our participants. Nine of the ten were hired without a search committee and without formal criteria. Most were hired serendipitously and previous research would predict suboptimal outcomes, such as dissatisfied faculty, and faculty that are not well suited for their appointments. This is not, however, what we found. We found participants who were quite satisfied in their work and who were not only a good fit for their appointments but brought experience and skills that made them a clear asset to their departments. It seems that the lack of a formal hiring process has allowed these participants to enter easily into a teaching career. There is a danger here, then, in formalizing the hiring process. When search committees are formed to hire full-time non-tenure-track faculty members, who will serve on those committees? By what criteria will the candidates be judged? The

department must be careful to not take a deficit-view of non-tenure-track faculty, holding the tenure-track criteria up as ideal with deviations considered negative. Ironically, the call to formalize faculty searches could result in the creation of criterion that inadvertently exclude a rich, dynamic, diverse group of candidates.

As an example, suppose the search criteria included the requirement that candidates hold a terminal degree in their field, a common requirement for tenure-track searches. That requirement would have eliminated half of our participants. Alan, who was the engineering manager of a corporation, reporting to the CEO, would not make the cut. Frank, who went on to develop a RF course and laboratory, providing students in his department a valuable skill set, would not make the cut.

As another example, a search committee may place significant value on research capability or require a research statement, a common requirement for tenure-track searches. Most of the participants would be at a serious disadvantage when competing against post-doctoral students who had performed research in university labs. Most practicing engineers do not write research papers as part of their work, they develop products and processes and any research they do is often proprietary and therefore not published.

If the composition and criteria of the search committee are not carefully designed, the department will miss the remarkable diversity available and could instead recruit candidates that would be better suited for a tenure-track career. This diversity will certainly be missed if the department uses full-time non-tenure-track appointments as a "holding pattern" while the institution waits for a tenure-track position to come open.

This is an important, urgent, area for programs to consider and for future research.

Criteria for Career Advancement

If engineering programs continue to recruit full-time non-tenure-track faculty members with diverse backgrounds, another important matter is to examine the criteria for career advancement. In a previous study (Fitzmorris et al., 2016), we found that some participants could not advance in their careers because they did not possess a terminal degree in their field and a degree in education which they perceived as more germane to their work would not suffice. Prior career experience and educational research should contribute to career advancement.

We see a clear injustice in the case of Ethan whose decades-long engineering career in the military and later at a prestigious laboratory was not counted towards his career advancement because he did not at the time have a doctoral degree. This might make sense for a tenure-track pathway in which every candidate earns a doctoral degree before beginning their career, but does not make sense for full-time non-tenure-track faculty who may have had careers that did not require or reward doctoral degrees.

To create a culture where full-time non-tenure-track faculty with diverse backgrounds are valued and respected, career advancement policies need to be reviewed and carefully designed to encourage this rich, diversity of career paths. The temptation to hold up the tenure-track career advancement criteria must be resisted, many full-time non-tenure-track faculty will not be interested in pursuing a terminal degree in their field and will not be interested in performing research, even educational research. It is possible to create a viable career path that relies on teaching skills, the development of

new courses, of new laboratory capabilities and spaces, and contributions to departmental educational goals.

We have uncovered an important and beneficial dimension of full-time non-tenure-track engineering faculty. By carefully designing recruitment and advancement policies, engineering departments can tap into the remarkable diversity of full-time non-tenure-track candidates, enriching their programs and improving student outcomes.

Chapter 5: The Career Goals of Non-Tenure-Track Full-Time Engineering Faculty

Author's Note: This paper was published in the Proceedings of the 2016 Frontiers in Education Conference. It is reproduced here with only minor changes. The citation format was changed to maintain consistency with the rest of this document. The author of this dissertation wrote the paper in collaboration with his advisors, Dr. Deborah Trytten and Dr. Randa Shehab.

Introduction

The number of full-time non-tenure-track (FT-NTT) faculty in universities in the United States is growing rapidly (Cross & Goldenberg, 2011). Engineering colleges are seeing this same rapid growth in the full-time non-tenure track ranks. According to data obtained from the American Society of Engineering Education's Survey of Engineering Colleges (ASEE, 2014), 8.9% of all full-time faculty at engineering colleges are non-tenure-track.

With roughly one in eleven full-time faculty members being non-tenure-track, it is natural to wonder whether this trend is good for students. Attempts have been made to show whether tenure-track professors produce better student outcomes than non-tenure-track teachers with mixed results (Figlio, Schapiro, & Soter, 2015; Lasfer & Pyster, 2013; Umbach, 2007). An important consideration in these studies are the preconceptions that the researchers bring with them to the study. Some theoretical frameworks are more useful than others in explaining the motivation and success of non-tenure-track faculty (Kezar & Sam, 2011).

Gappa and Leslie (Gappa & Leslie, 1993) studied part-time non-tenure-track faculty and found that attempting to understand part-time faculty as a whole is difficult because the group is not homogeneous and different segments of the population have

different motivations and goals. They identify four different categories: aspiring academics, freelancers, specialist/professionals, and career-enders. Aspiring academics were teaching part time in hopes of obtaining a tenure-track position. Career-enders did not desire a full-time position, but had retired and were looking for just a class or two. The specialist/professional category is especially prevalent in engineering education since this group is composed of people who are actively practicing the profession and teach one or two classes on the side.

We expect that the study of full-time non-tenure track faculty will require a separation into categories as well. The four categories identified above that were useful in understanding the part-time teaching faculty are a good starting point for understanding the full-time non-tenure track population. One question to investigate is whether these four categories describe FT-NTT faculty as well as they describe part-time non-tenure track faculty.

It is tempting to assume that all FT-NTT faculty are aspiring academics who desire tenure-track positions should one become available. If this were true, perhaps departments should provide some path to tenure in order to motivate and retain this pool of talent. If, on the other hand, FT-NTT faculty are not interested in tenure but are motivated by something else, then providing an alternate career track would be useful. Knowing what motivates non-tenure-track faculty could also inform recruiting efforts. The ability to attract and retain quality FT-NTT faculty can help a department meet its teaching objectives.

Our goal in this study is to explore the career goals of ten FT-NTT faculty members who teach electrical engineering at large, public, research institutions. We will

explore their motivations to pursue a tenure-track position. We will explore the aspects of tenure that are attractive to FT-NTT faculty as well as those that are unattractive.

Our research questions are:

1. Do full-time non-tenure-track teaching engineering faculty desire tenure-track positions?
2. What career progression, if any, is available to them in their department?
3. What aspects of tenure, if any, are appealing and unappealing to them?

Methodology

This study is a general qualitative study (Waltman et al., 2012; Creswell, 2007) using a criteria-based sampling strategy and a semi-structured interview (ASEE, 2014) to collect data. We used a sample size of ten which for a qualitative study of this type can produce significant results (Meyer, 2014; Foor et al., 2007).

Sampling

Since the purpose of this study was to explore the career goals of typical FT-NTT teaching faculty, we chose sampling criteria that would select participants from a typical teaching environment: large, public universities with a proportion of FT-NTT faculty similar to the national average. We used the American Society of Engineering Education data mining tool to determine which universities have a proportion of full-time non-tenure track engineering faculty that are similar to the national average (ASEE, 2014). We visited the public website of the electrical engineering department at each university and looked for faculty titles that included the words instructor, lecturer, or teaching. We chose electrical engineering because every university we chose had an electrical engineering department and since the researcher conducting the interviews is

an electrical engineer, he could better understand the nuances of the interview. It is possible that this strategy missed some FT-NTT faculty members because their titles did not include these key words although only one of the universities we looked at did not have any faculty members with the aforementioned title modifiers. We sent out forty recruitment emails to prospective participants at thirteen universities. We conducted ten interviews with participants from eight universities.

Data Collection

The interviews were conducted via telephone. There were fourteen questions and each interview lasted between thirty and forty-five minutes. Participants had been provided copies of the interview protocol several days before the interview to provide them with an opportunity to reflect on the questions in advance. Since the interviews were semi-structured, all the participants were asked the same questions but the interviewer had the freedom to ask clarifying and probing questions.

Data Analysis

The interview transcripts were coded using data analysis software (NVivo) that allowed coding of the audio directly without the need for transcription. We used a preliminary code set initially but added codes as the interviews were processed and as themes emerged from the data. The preliminary code set was developed from the research questions and included codes for current and available positions, the potential for and benefits of career advancement, and aspects of tenure that were desirable or undesirable.

Direct quotes from the interviews appear later in this paper and appear in italics. Text that appears in square brackets indicates a substitution made for clarity, for

example to replace a pronoun. An ellipsis indicates that part of the sentence was left out of the quote for brevity, typically an aside, tangent, or rectification that did not provide useful information.

Subjectivity Statement

The author who conducted the interviews and performed the data analysis is a full-time non-tenure-track faculty with industry experience. While conducting the interview, he attempted to maintain a neutral posture but his background influenced the probing questions that he chose to ask and the topics that he chose to clarify. During data analysis, he was especially careful not to project his personal feelings onto the data and to accurately portray the views of the participants.

Results

Desirability of Tenure

None of the ten participants in this study wanted to pursue a tenure-track position at their institution. Even if there was a path and even if the position were offered to them, they would not leave their non-tenure-track position to become tenure-track. In response to the question "What is your decision process when you think about staying non-tenure-track versus becoming tenure track?" one participant responded:

> That decision would take almost zero mental bandwidth. I do not want to do what the tenure-track associate professors do. They are held to a publish-or-perish standard and that has always been a big turn-off for me. I don't want to go there.

Another participant noted that she would have to decrease her teaching load:

> What would that gain me? If I enjoy the teaching, why would I want to swap that out for having to hunt down research funding?

The most common reason given for not wanting to pursue tenure was the participant being unwilling to spend more time on research if that meant spending less

time teaching. In response to the clarifying question "So you would rather teach than publish?", one participant said:

> Absolutely, I'm a born teacher. I've known that all of my life. Now I'm in a position where I can actually afford to do it.

Another participant said:

> Every aptitude test I've taken from elementary school until now has told me that I should be a teacher. ….. I can see that what some of [tenure-track] people are doing is truly cool, interesting stuff. I can see the allure from their point of view. If you truly love what the research topic is, you might be willing to put eighty hours a week into the job. When I was working in industry and working on pet projects, eighty hours felt like just another week, it wasn't a burden. But I don't have that drive in research. There's nothing driving me to want to get my PhD and put myself into that situation. Particularly because not only do you have all that responsibility, but because that extra responsibility takes you out of the classroom and you lose that time to focus on your teaching and you don't get to know the students as well.

Sources of Motivation

For nine out of the ten participants, their primary motivation for being a FT-NTT faculty member is an intrinsic love of teaching and working with students. Three of the ten participants spontaneously referred to their career as "a calling". The primary motivation for one of the participants was the predictability and stable schedule at the university compared to her industry career. While salary and status were important considerations, they were not important motivators for these participants.

Regarding their career motivation, one participant said:

> I've come to this because it's more of a calling. I have some experience in industry so I have really different motivations … because you really want to make a difference, there's a real need for students to get their degree, you want to make it better than when you went through. You want to make a difference.

From another participant:

> You're definitely not in this for the money. The pay is about 50% higher out in industry for someone with my background. You've got to love teaching the

> students and helping them become engineers that are professional, educating them. You really have to have a passion for that. This is not an 8-to-5 job.

Another participant discussed his motivation for teaching compared to salary:

> I love my job. There are issues with it, obviously, but I love what I'm doing. I would recommend it to somebody who is willing to deal with some disappointments, like not having the same level of career advancement. As long as what you want to do is teach and that's the thing you actually have a passion for, I would say it's worth it. I make enough money and I have the insurance that I need…If you don't love to teach, this is not the job you'd want.

Path to Tenure

None of the participants in this study were interested in pursuing a tenure-track position, but we asked them if they were interested, was there a path to tenure and if so what that path would involve.

For participants who had a terminal degree, there was a path to tenure and it was the same path that any other candidate for the position would follow. Apart from relationships they had formed in their department, the process for them to become tenured would be to apply for a position when it came open. It was clear, however, that the criteria for being hired was the quality of research and since most of the participants had been in industry and teaching for some time, their chances were not good.

For participants without a terminal degree, the path to tenure would include finishing a doctoral degree. In all cases, this was not considered a viable path because it would require devoting a large amount of time and energy into research and therefore decreasing the time in the classroom and with the students.

Career Titles and Progression

The participants have a wide range of titles but they can be grouped into three categories. Four of the participants have titles similar to those of the tenure-track with a modifier attached, for example Associate Professor of Practice or Assistant Professor,

Teaching Faculty. Four of the participants have the title of Lecturer, sometimes with a modifier like Senior or Principal. Two of the participants had the title of Instructor: Senior Instructor and Instructor.

The prospect of career progression also varies widely among the participants. The most sophisticated system (one institution) had a nine-cell matrix of titles with one dimension being the titles of Lecturer, Senior Lecturer, and Principal Lecturer and the other dimension being the level, either 1, 2, or 3. A more typical progression has three titles: Instructor, Lecturer, and Senior Lecturer. Four of the participants can progress along an alternate "career-track" which was not tenure-track but used similar titles like Assistant Professor, Associate Professor, and Full Professor. There are varying modifiers such as Professor of Practice or Lecturing Faculty or Teaching that distinguish the alternate track titles from the tenure-track titles.

It was common for participants to note that the titles used by their department or the progression used by their department were different than other engineering departments or the university at large. Even though there seemed to be the possibility for career progression, often all of the FT-NTT faculty were categorized in just a subset of the available roles. The department with the nine-cell matrix of positions had all of the faculty grouped into only two of the cells. The participant from that department was surprised to find out that he was only a short time away from qualifying for a promotion, but only found that out when preparing for the interview. In all, four of the participants felt like the requirements for promotion were clear and four did not know what steps needed to be taken for promotion or felt like the requirements for promotion were vague and unclear. The other two participants did not comment on the promotion

process of their departments. Overall, the career progression for most of the participants seemed informal and ill-defined.

Several participants expressed dismay that in order to progress in their career, they needed to obtain a doctoral degree but that obtaining a degree in education would not count. While talking about the necessity of a terminal degree to be promoted along the non-tenure-track, one participant commented:

> I would argue that maybe it is appropriate that you need a PhD for that level, but let's clarify that. A PhD in [specific technical field] which is what my Master's degree in, is not going to help me in any way. That should not count towards the promotion. But something along the lines of educational psychology or engineering education, one of those PhDs where the focus of the research is improving pedagogy. That has merit, but in my department, that PhD would be counted as less valuable than a more technical degree.

Another participant expressed frustration:

> It's frustrating to me because I went back to get my PhD but I was completely uninterested in the classes and research. I want to teach, that's what I want to do. I don't want to spend my time on things that don't contribute to that just to get a piece of paper that will allow me to be promoted.

Six of the respondents spoke about the benefits of promotion within their department. All six noted that there is a pay increase, always described as small, and for two of the participants there was an increased contract length. This additional career stability seemed to be much more valuable to the participants than the raise in salary.

Career Stability

We did not directly ask about contract length but six of the participants commented on it. One of the participants in the study has a five-year contract and expressed significant satisfaction with it. Four of the participants have three-year contracts and one had a semester-by-semester contract. In all cases, the contracts were fixed length and were either renewed at the end of the contract or not. The participant

with the semester-by-semester contract, who would seem to be the most vulnerable, expressed confidence in his continued employment not because of his contract, but because the classes he teaches "need to be taught and no one else wants to teach them". Two other participants noted that they teach the Capstone Design course, which is required by ABET, and since the tenure-track faculty did not want to teach that course, they felt that they were more likely to have their contracts renewed.

One example of a participant who did not depend on his contract for career stability said:

> Coming from industry, I knew at any moment that if I was failing to do my job or deserved to be terminated, I would get maybe two weeks' notice. So to have a one-year contract or a three-year contract, honestly it wouldn't change my career or my attitude… If funding cuts continue and there's a financial emergency, then we're all on the chopping block [regardless of contract length] and I don't think I'd be the first to go because I teach Senior Design.

When the participants spoke about their contract lengths, it was interesting that the end of a contract was not always accompanied by anxiety or uncertainty, although one participant did mention that "the battle comes at renewal time". Most of the participants felt that their continued employment did not stem from their contract length, but from the role that they played in the department, especially the courses that they taught. One participant noted:

> At first, I was worried every semester, am I going to get renewed, am I going to get renewed? It's been years though and now I'm somewhat required for the department to function. If it weren't for me and a few other people, the classes simply wouldn't get taught. So while every semester it's technically up in the air whether my contract renews, in reality, I will always get renewed.

Discussion of Results

They're Professional Teachers, Not Aspiring Academics

The participants in this study clearly do not fit the description of the "aspiring academic" because they are not seeking a tenure-track position. In fact, it is clear from their interviews that if a person wanted to become a tenure-track faculty member, taking this type of position may lead to frustration and stagnation. For most of these participants, the decision is not whether to pursue tenure or not, but whether to return to industry or not. Industry pays better but most of these participants are intrinsically motivated to teach and work with students and those opportunities are limited in industry. These participants seem to be an outgrowth or an evolution of the specialist/professional category identified by Gappa and Leslie (Gappa & Leslie, 1993). They were specialist/professionals but their desire to teach led them to move from full-time practicing engineers and part-time teachers into careers that are part-time practitioners and full-time teachers, a new category that we call "professional teachers" for two reasons. One reason is because teaching is now their profession and the second reason is that what they are teaching is the engineering profession, they are teaching students to become engineering professionals. They feel "called" to form their students into engineering professionals using the experience they gained from working in industry.

While the participants in this study did desire some career aspects often associated with a tenure-track position such as increased career stability, for their accomplishments to be recognized, and for meaningful career progression, these aspects could be gained in a "career track" that is not tenure-track. For example, a three-year

"rolling contract" in which the department makes a three-year commitment to the faculty member that is renewed each year would increase career stability. Meaningful promotion through a set of ranks would recognize teaching excellence and length of service.

Career Progression

Although none of these ten professional teachers desired tenure, they did desire some aspects of tenure. The aspect of tenure that was desired most often was additional career stability. It was expected that new non-tenure-track faculty would have a shorter contract length, but there was a desire for that contract length to increase as the faculty member gained more service in the department. Rolling contracts as opposed to fixed-term contracts were even more desirable because it mitigates the uncertainty of renewal. There is a subtle benefit to longer contracts that was mentioned by the participant who had the five-year fixed contract. His longer contract allowed him to plan farther in advance with confidence that he would be around to finish the implementation which was a benefit to the college. If a faculty member has a one-year renewable contract, they are less likely to plan two or three years in advance.

The second aspect of tenure that was desirable was a meaningful ranking system. Four of the participants had such a system in their department, modeled after the tenure-track but separate from it. The other participants did not have meaningful ranks. This was desirable because increasing through the ranks distinguishes those who have long service or have made significant contributions from those who are just starting out in the department, providing additional symbolic capital.

The issue of making progression through the ranks dependent on having a terminal degree was irksome to several of the participants. If they came from an industry where a terminal degree was not necessary, they saw it as a needless diversion from teaching unless the terminal degree was in the scholarship of teaching. Allowing an exception for significant industry experience or allowing engineering education research to count towards promotion were suggested solutions to this issue. Participants who had terminal degrees received them before they became full-time teachers, so this was not an issue for them. In all cases, the prospect of getting a terminal degree while being a FT-NTT member did not seem worth it unless that degree was going to improve their teaching.

Conclusion

These ten FT-NTT faculty do not want to transition to tenure track. While they would appreciate some aspects of tenure, specifically the additional career stability, higher pay, and meaningful career progression, they are clearly not interested in developing or maintaining the type of research program associated with gaining tenure at a research university. Research in the areas of engineering education, especially the scholarship of teaching, was interesting to them and several participants would be interested in developing a research program in those areas. Continuing education opportunities in the area of engineering education are valuable to non-tenure-track teaching faculty.

FT-NTT teaching faculty have a strong concern for undergraduate students and especially their preparation for industry but are not as interested in the

graduate program. Including the teaching faculty in the undergraduate program decisions but not the graduate program makes sense.

Departments that value their non-tenure-track faculty should examine the career progression for non-tenure-track faculty members and seriously consider making the "career track" a well-defined and predictable career path. The desirable aspects of tenure, longer contract lengths and increased involvement in departmental decisions relating to undergraduate education, eligibility for awards and education grants, could be provided for the career track without modifying the tenure-track process.

Since the non-tenure-track full-time teaching faculty will be primarily concerned with teaching and will have little time to pursue a separate research program, it makes sense to recruit people for the positions that are passionate about teaching and to deemphasize their research credentials unless that research was related to engineering education. It is clear from our participants that hiring a person whose career goal is to become tenure-track into a non-tenure-track position with the hopes of a transition later may lead to frustration on the part of the faculty member and can be harmful to future tenure prospects unless the demands of teaching and research are carefully balanced.

The tenure-track and the non-tenure-track are two different, but complementary components of most engineering departments at four-year research universities and it will become more so in the future. It is clear that both the tenure-track and the non-tenure-track faculty have a significant impact on the day-to-day lives of the undergraduate students through their teaching and advising. Recognizing the importance of the non-tenure-track faculty and taking steps to ensure their development

and career satisfaction will not only increase their motivation to teach but also should lead to better undergraduate outcomes.

Understanding the career goals of full-time, non-tenure-track faculty members will help engineering programs design policies that will further the career goals of their non-tenure-track faculty without necessarily requiring them to pursue tenure. Understanding the career goals of non-tenure-track faculty can help us build engineering programs that are inclusive of this fast-growing segment of the faculty and encourage their active participation in building and strengthening those programs.

Future Directions

This qualitative study explored the career goals of a limited sample of full-time, non-tenure track teaching faculty working in engineering programs at large, public research universities. There are other avenues that should be explored to understand this topic in more detail.

While it is interesting that all ten of these non-tenure-track faculty did not desire a tenure-track position, it is not reasonable to generalize that result to the population at large. A larger, quantitative survey of non-tenure-track faculty would allow the testing of that finding to determine whether it is generalizable.

There are other aspects of the FT-NTT engineering faculty experience that were mentioned by the participants in this study but were not a part of the interview protocol in this study and therefore received limited attention. Additional topics are: the pathway into the non-tenure-track career being unpredictable, non-tenure-track faculty feeling like “second-class citizens”, the role of industrial experience in engineering education, and the role and availability of mentoring for non-tenure-track faculty. Future

qualitative studies will focus on these additional topics uncovered during our interviews.

Chapter 6: As Necessary as the Cleaning Crew: Experiences of Respect and Inclusion Among Full-Time Non-Tenure Track Engineering Faculty

Author's Note: This paper will be submitted for publication IEEE Transactions on Education. It is reproduced here with only minor changes. The citation format was changed to maintain consistency with the rest of this document. The author of this dissertation wrote the paper in collaboration with his advisors, Dr. Deborah Trytten and Dr. Randa Shehab.

Introduction and Literature Review

The Growing Importance of Non-Tenure-Track Faculty

A significant and growing portion of faculty members teaching in United States (US) universities are in appointments that do not offer tenure. These appointments are sometimes referred to as contingent or non-tenure-track (NTT). The Government Accounting Office (GAO), using data from the Integrated Postsecondary Education Data System (IPEDS), found that the percentage of all faculty members teaching at four-year universities in non-tenure-track appointments was 61% in 2015 (GAO, 2017). Considering only full-time positions, the percentage of non-tenure-track appointments at four-year universities in 2015 was 34%. In engineering programs, the percentage of full-time non-tenure-track faculty is significantly lower, 8.9% (ASEE, 2014) At four-year universities, non-tenure-track faculty teach between 45% and 54% of all courses (GAO, 2017). The use of non-tenure-track faculty is growing. From 1995 to 2011, the GAO found that the number of full-time tenure-track positions at all US universities grew by 9.6% whereas the number of full-time non-tenure-track positions grew by 109.2%. The reasons for the increase in non-tenure-track appointments, according to university administrators, are budget uncertainty, the reduced cost of non-tenure-track

faculty, flexibility in response to enrollment fluctuations, and the need for subject specialists (GAO, 2017; Hollinshead, 2007). These forces are not likely to change in the future, so it is reasonable to expect that the number of non-tenure-track faculty will continue to grow in the future.

Understanding Non-Tenure-Track Faculty

As the number of non-tenure-track faculty increases, concerns about the impact of this change on student learning emerged. Early quantitative studies showed that as the number of non-tenure-track faculty increased, student outcomes suffered. Umbach modeled non-tenure-track faculty as contingent workers and used data from the Faculty Survey of Student Engagement to show that compared to their tenure-track counterparts, non-tenure-track faculty were less likely to engage students, spend less time preparing for courses, use active and engaging teaching techniques, and had lower academic expectations for their students (Umbach, 2007). An analysis of data from the 1999 National Study of Postsecondary Faculty (NSOPF) showed that compared to their tenure-track colleagues at research and doctoral institutions, non-tenure-track faculty were significantly less productive both in research and in education, were less committed to their institutions, and work about four hours less per week (Bland et al., 2006). It is unlikely that this difference is attributable to the non-tenure-track faculty personally: the explanation may lie within the system in which these faculty operate (Bland et al., 2006; Umbach, 2007).

Kezar and Sam suggest that new theoretical models are necessary to understand non-tenure-track faculty and proposed that some earlier studies had used theoretical models that did not fit non-tenure-track faculty. For example, modeling non-tenure-

track faculty as contingent workers follows a deficit model based on the preconceived notions of the researchers and is not supported by empirical evidence (Kezar & Sam, 2011). Levin and Shaker (Levin & Shaker, 2011) wrote:

> Full-time non-tenure-track faculty are deemed accomplices, albeit unwitting, to the erosion of the academic profession, faculty power and undergraduate education. Their perspective on these claims and self-assessment of their own identity as professionals are not considered when these ascriptions are made and, indeed, are rarely considered at all. This omission enables observers and commentators to portray full-time non-tenure-track faculty in a negative light and use them as scapegoats for the ills of higher education.

Understanding non-tenure-track faculty requires new models, developed by exploring the experiences of the non-tenure-track faculty by asking the faculty themselves (Hollenshead et al., 2007).

Respect as a Foundational Value that Affects Student Outcomes

Gappa, Austin, and Trice found that non-tenure-track faculty work as "managed professionals" as opposed to contingent workers. As members of the faculty, they require five essential elements to be satisfied in their work: employment equity, academic freedom and autonomy, flexibility, professional growth, and collegiality. These five essential elements surround a core requirement which is respect. Respect is a foundational value on which the others depend and is defined as the basic human valuing of people for who they are and for what they uniquely contribute to the organization (Gappa et al., 2007). Without respect from their organization and their peers, the non-tenure-track faculty member is unlikely to benefit from, or to value, the other essential elements and therefore find little satisfaction in their work. Respect is related to a number of outcomes including increased faculty satisfaction, increased commitment to the organization, better recruiting and retention of faculty (Gappa et al., 2007; Kezar, 2013)

Factors that contribute to job satisfaction for non-tenure-track faculty are teaching and working with students, flexibility in their work schedule, and the ability to balance the demands of both work and personal life. Factors that contribute to job dissatisfaction are the terms of their employment, lack of career advancement, and issues of respect and inclusion (Hollenshead et al., 2007; Kezar, 2013). Here, the concepts of job satisfiers and dissatisfiers are taken from the work of Herzberg who found that satisfaction and dissatisfaction are separate dimensions as opposed to being opposites on the same dimension (Herzberg, 1966). Institutions can meet the goals of providing a high quality education that prepares their students to contribute to society while also creating a vibrant, qualified professional faculty by providing an environment and structure that is motivating to all faculty members, both tenure-track and non-tenure-track (Hollenshead et al., 2007).

Kezar studied departmental culture with respect to the experiences of non-tenure-track faculty, with an understanding that groups within an organization may experience different cultures, even though they share a common reality (Kezar, 2013). It is reasonable to expect then, that non-tenure-track faculty would experience a different culture than tenure-track faculty even though both groups operate within the same department. The data collected from that study included interviews with 107 non-tenure-track faculty in twenty-five departments within three universities. Analysis from the data showed that the departmental cultures experienced by non-tenure-track faculty could be represented by four types: destructive, neutral (or invisible), inclusive, and learning. Dimensions used to categorize the cultures were respect and inclusion, hiring practices, terms of employment, opportunities for professional development,

opportunities for career advancement, access to resources including materials and staff, and departmental policies. Drawing on Blumberg and Pringles's work, these cultural aspects were mapped to an "opportunity to perform" and a "willingness to perform" (Blumberg & Pringle, 1982). The destructive culture where non-tenure-track faculty were found to be disrespected, to be hired haphazardly, did not have access to departmental resources such as an office or office supplies, lead to poorer student outcomes and dissatisfied faculty whereas the learning culture where the non-tenure-track faculty are respected, included in curriculum development, and are given the resources they need to be successful led to better student outcomes.

Respect is clearly a foundational value that all faculty, including non-tenure-track faculty, expect. Respect is essential to avoiding job dissatisfaction that degrades student outcomes (Hollenshead et al., 2007; Kezar, 2013). Prior studies have included faculty from a broad range of disciplines, noting that faculty from engineering and business programs are likely to have a different experience because of their professional careers. This study specifically explores the experiences of engineering faculty, uncovering aspects of non-tenure-track faculty life specific to their careers.

The Nature and Purpose of this Study

The data from this study were collected during two of our previous qualitative studies, one on the career goals of non-tenure-track engineering faculty and the other on the pathways into the non-tenure-track teaching career. During the coding and analysis of the interview data, we found the emergent theme of respect and inclusion although none of our questions asked about either respect or inclusion.

Methodology

This is a general qualitative study using a criteria-based sampling strategy, semi-structured one-on-one interviews for data collection, and thematic coding using NVivo software for data analysis (Creswell, 2007).

Sampling

This study uses interview data collected and analyzed in two of our previous studies. For our first study on career goals of full-time non-tenure-track engineering faculty, we were interested in the experiences of typical non-tenure-track engineering faculty members and so we designed our sampling criteria to select typical cases (Creswell, 2007). We first used the American Society of Engineering Education data mining tool to determine the national average of full-time non-tenure-track faculty members as a percentage of all full-time faculty members (ASEE, 2014). We wanted participants in the study to be typical non-tenure-track full-time engineering faculty working in US research universities. Our sample set began with engineering programs at universities with a R1 Carnegie rating. From that set, we selected electrical engineering programs that had at least ten full-time faculty members. We chose electrical engineering departments because every engineering college that matched our criteria has an electrical engineering department and the author who conducted the interviews (Fitzmorris) is an electrical engineer and thus could more completely interpret the nuances of the responses in discipline-specific discussions. We sorted the programs using the percentage of full-time faculty that are non-tenure-track. From that sorted list, we selected universities whose percentage of non-tenure-track faculty was near the national average.

For our study on career pathways, we initially contacted the ten participants from the first study. Seven agreed to participate in the second study. We replaced the three who did not respond using the same criteria and process we used for the first study. Between the two studies, we had a total of thirteen participants from nine universities.

Data Collection

We collected data using semi-structured, one-on-one interviews. In the career goals study, the interview protocol consisted of fourteen questions; for the career pathways study we used seventeen questions. Each interview was intended to last forty-five minutes although the participants were encouraged to elucidate their answers and the use of probing questions added to the interview times. The shortest interview was thirty-five minutes and the longest interview was fifty-eight minutes. We provided the participants with the interview questions several days in advance to allow them to reflect upon the questions. The interviews were conducted over the phone at a time and location selected by the participant.

Data Analysis

The interviews were audio-only, conducted via telephone, and recorded for later analysis. The audio data were coded directly without transcription using qualitative analysis software (NVivo 11) with an initial code set that had been developed from the research questions and the interview questions. The code set contains twenty-two codes with four codes being added as emergent codes during the coding process.

Direct quotes from the interviews appear later in this paper and appear in italics. Where quotes include content from both the interviewer and participant, the

participant's response is preceded by "P:" and the interviewer's question is preceded by "I:". Interview data that appears within square brackets, [ ], are clarifying remarks made by the authors. Interview data that appears within curly braces { } are details that have been removed to protect the identity of the participant.

Subjectivity Statement

The author who conducted the interviews and performed the data analysis (Fitzmorris) is a full-time non-tenure-track faculty with industry experience. While conducting the interview, he attempted to maintain a neutral posture but his background influenced the probing questions that he chose to ask and the topics that he chose to clarify. During data analysis, he was especially careful not to project his personal feelings onto the data and to accurately portray the views of the participants to the best of his abilities The other two authors are tenured faculty members, one in an administrative position.

Results

The data from this study originated from two prior studies of full-time non-tenure-track engineering faculty. The interview questions explored the participants' beliefs and attitudes towards tenure, their prior career experience, and their motivation for seeking a teaching position. Although none of the questions in the interview protocol asked about respect or inclusion, nine participants spontaneously shared experiences related to respect and inclusion. Our participants discussed respect and inclusion in three different, but sometimes overlapping, dimensions: having a voice in departmental governance, being valued as one of the faculty as opposed to a subordinate, and university policies.

Having a Voice or Being Silenced in the Department

Four of the thirteen participants, all from different universities, described experiences of feeling excluded from departmental discussions involving topics that have a direct impact on their day-to-day work.

During a discussion of the attractive features of tenure, one participant shared this experience of being silenced and openly disrespected.

> I: When you look at the tenure track positions in your department, are there parts of that position that you wish were part of your non-tenure-track position? Are there some things that the tenure-track faculty get that you want?
>
> P: No, there's nothing (long pause), except respect. I will say that. We have an annual faculty retreat before the fall semester starts. At our fall retreat last fall, the subject of lecturers came up and one of the tenured faculty members was very blunt and said in so many words, "I don't like lecturers, I don't like that we depend on lecturers". I wanted to rip his throat out.
>
> I: Did he say this in front of you? Were you in the room?
>
> P: I was there. I and two other lecturers were there. We held our peace because the conversation was being run by the Dean of the School of Engineering. The subject was identifying an interim chair for the department. He wanted to get a sense from the faculty who the new chair should be and he was very clear at the outset that he wanted the opinion of the tenured faculty.
>
> I: Do you mean to say that he was very clear that he didn't want the opinion of the faculty that were not tenured?
>
> P: He didn't say it that way, he said that he wanted to hear what the tenure-track faculty had to say. When you specify a subset of the faculty, then in my binary mind, you have basically invited the other part of the faculty to maintain silence. And so I did. Several weeks later, I had an opportunity to gently confront that faculty member who had said that, and he excluded me personally, he said "I didn't mean you". I said, "That's not the point. What you have opened the door for is that now all the tenured faculty have to teach these low-level classes that you very specifically do not want to teach and we're here to relieve you of the burden of teaching these lower-level classes so you can focus on your subject-matter area. If we're not here, you've got to divert yourself into areas that you don't want to go into." He was overlooking that fact. We serve a very important role in the educational process and get very little respect. That's the one thing that bothers me the most.

I: Just to summarize, it sounds like it's OK for the lecturers to be around because you serve a need, but if there was another way to satisfy that need, he'd rather you be gone.

P: Yeah, it's almost an exaggeration but not much of an exaggeration to say that we also have a cleaning staff here and it's OK for them to be around too.

In response to the same question, a participant from a different university shared a story of not being included.

I: Are there aspects of tenure-track positions that you wish were part of your position?

P: The biggest thing that bothers me right now is that the faculty, well actually the department head who recently changed, has decided that basically non-tenure-track faculty don't get a first-person say in the operations of the department. So obviously I don't get a vote on whether people get tenure, which I expected coming in, but I also don't get a vote on what our goals are for this year, or our objectives. When they had the faculty retreat last year where they talk about that stuff and do presentations, I wasn't welcome or part of the discussions.

I: Were you invited but told not to vote or were you not invited?

P: I was uninvited. I got to present at the faculty retreat but was then asked to leave.

Another participant described the feeling of not being included in departmental governance.

I: What are the differences, if any, between the tenure-track and non-tenure-track members of your department?

P: It's a little different for us because we're physically separated from some of our colleagues. We have two campuses separated by {several} miles. We don't have interaction with people in the hallway, we don't have shared office space. It's definitely different, we're definitely seen as separate. We don't have certain voting rights. There's been some contention about changing our by-laws or departmental rules. If you're tenure-track, you're considered regular. So we're wondering, are we irregular? Essentially, we feel that way. We feel like we don't have the same respect. They don't respect what we do, we're not bringing in research dollars but we are teaching.

One participant was allowed to participate in faculty meetings but for several years did not feel comfortable participating.

I: What are some of the differences, if any, between the non-tenure-track faculty and the tenure-track faculty in your department?

P: I would say that for the first five or seven years of being in faculty meetings, I just sat there and kept my mouth shut. I didn't say anything. I don't think I had the respect of anyone. I would throw a comment out here and there. Once I became the undergraduate advisor, about five years into my career, and I started working on revising the curriculum and improving it by really working hard on that area, people started to realize that I had something to offer.

These four participants want to be included in their department's governance and feel that they are excluded not only from voting but in some cases from even being able to listen to the discussion. Two of the participants were allowed to attend but understood they should remain silent while the other two participants were not invited to be part of the discussion.

Being Respected as a Peer

One participant, who had a career in the military followed by a career in which he rose to the level of division manager at a national laboratory, described his experience of feeling "less than" in his department.

I: Once someone starts in your department as a non-tenure-track faculty member, what should they do to be successful in this track?

P: Well, the primary role is teaching. There is clearly a bias between the tenure-track-faculty and the non-tenure-track faculty. The non-tenure-track faculty are already at a disadvantage even if you do great work because you're considered kind of a fill-in for where the tenure-track faculty can't cover. I don't know if you've experienced that, but there's already a built-in bias against non-tenure-track faculty.

I: I have experienced that, but I don't want to influence your responses, so tell me about your experience (both laugh).

P: It's very evident in the interactions between us. I serve on a number of committees. Where I get my credibility is that I have hired many engineers myself, so I know what traits employers are looking for.

I: Do you think your colleagues recognize that credibility?

P: Some of them do, the ones I've had interactions with that have been in authority and the ones I have regular interaction with.

A participant who has been a member of the department for nearly twenty years discussed an exchange with the department head.

P: My first department head was here for fifteen years and he and I got along very well and he was very supporting. Now another department head has come in. He was an internal appointment, he'd been the head of the graduate program and so his focus is on graduate studies. He's not naturally in favor of non-tenure-track faculty, he thinks we're getting by with something or putting ourselves over as having PhD's when we don't. In my first annual review, out of nowhere, first he goes into the review and why I was rated excellent and then he turns and said, "You know, we have too many non-tenure-track faculty and we're going to fire some. I don't think you have to worry but you should know that a lot of the non-tenure-track faculty are going to be fired." Now what kind of attitude is that? Ever since then, he's reinforced that. I'll give you an example from last week. In the past I wouldn't have done this but lately he really seems concerned about money. So I emailed him and told him I was planning on going to a Capstone conference and I have the money so I'll be paying for it and I don't know if you want to approve this, but I'm letting you know. He wrote back and said "I approve, and when you come back, write me a one-page paper on what you learned at the conference."

I: So how did you feel about that?

P: It's a week later and I'm still mad about it. It's like I'm a student, like an undergraduate student!

A participant who had a successful engineering career before teaching in his department described his feeling about his position in the department:

P: I was the program manager and built an entire microelectronics division for a company, and from that to upper-level management for a consulting company. I reported to the president and had many subordinates. Now, I'm the lowest guy here and there's no real chance for advancement or promotion, that's not entirely true, but the promotions are pretty minor. So am I going to spend the rest of my career as the lackey when I started my career as "the guy"? That's a little hard on the ego.

In a separate part of the interview the same participant said

P: I would argue that non-tenure-track faculty are almost treated as second-class citizens, that we weren't good enough or smart enough or whatever. I've just learned to let that roll off my back but what they don't understand is that for the

> job I have, I'm significantly better at it than people who are supposed to be higher qualified than I am. I'm good at what I do and this is what I want to be doing. If they want to call that second-class, fine by me, but I don't have the desire to get that piece of paper [a PhD] to enhance my prestige.

These three participants had successful careers before becoming engineering faculty. Their descriptions of feeling "less than" in their departments are especially salient when juxtaposed with their experiences of being respected earlier in their careers.

Experiences of Self-Worth and Value to the Organization

Several participants described their beliefs about their value to the department. Sometimes their value is validated by their colleagues and sometimes it is validated by their previous experience or by professionals outside the department.

One participant described respect from colleagues:

> I: It sounds to me like your position in the department is solid enough that being let go doesn't occupy a lot of your thoughts.
>
> P: No, it really did over the first five or six years, but over time I started to realize that people thought I was pretty good at what I was doing and I became very respected and wanted there.

In another part of the interview, this same participant said:

> P: Anything related to graduate studies, I stand back from because I don't think they want my opinion. Anything related to undergraduate curriculum I certainly do and I expect them to come to me if they have a question. So I feel that I'm on equal footing with any of the faculty relating to undergraduate curriculum.

Another participant at a different university described being valued by colleagues:

> P: I've had no significant problems in my interactions with the faculty and certainly no direct problems. With my role in the department, which is fairly visible, I get enormous respect and support from the faculty but my department head is not supportive and I hope the next one will be.

Another participant described being valued by an advisory board:

> P: The most powerful allies I have in this fight are the outside board. We don't have any other faculty on the advisory board, they're a CEO of {local company}, vice-president of {local company}, director of {national company}. They're all professionals. That's the single biggest thing that got me respect in the department, when the advisory board started to comment that I was someone who really understands what needs to be done.

These participants do feel they are a valuable part of their departments and have significant contributions to make in undergraduate education. Those who have found respect from their peers have earned it over time, starting from a position of little respect.

Discussion of Results

The results presented in this study do not correspond to the research questions in either of the studies from which the data were gathered; they are additional fruit borne of the open-ended interview questions that give insight into the experience of full-time non-tenure-track engineering faculty. Although none of the questions asked by the interviewer dealt with respect or inclusion, nine of the thirteen participants spoke about those topics, some with stories that expressed strong, visceral reactions to particular incidents. These emotions were particularly evident when a participant had a previous engineering career where they enjoyed significant respect. Respect and inclusion is clearly an important topic for a majority of these participants and worthy of further study.

The nine participants who spoke about respect and inclusion came from eight different universities. This is not a case of one or two dysfunctional departmental cultures that are isolating or silencing their non-tenure-track members. It is likely to be a more widespread phenomenon although it is not reasonable to draw that conclusion globally from this qualitative study alone.

This study demonstrates the importance of using qualitative research methods to hear the voices of the non-tenure-track faculty themselves.

An Additional Identity of Engineering Non-Tenure-Track Faculty: Practicing Engineer

Levin and Shaker found that full-time non-tenure-track faculty have a dual identity. "In the classroom and with students, they have practice identities as expert teachers; in interactions with tenured faculty, full-time non-tenure-track faculty become subaltern as their placement on the academic hierarchy diminishes their influence and power within their figured world." (Levin & Shaker, 2011). We have certainly seen this dynamic present in the responses of the participants in this study. The participants in Levin and Shaker's study were faculty in the English departments of four-year research institutions. Levin and Shaker note that faculty in business or engineering departments may have a different experience due to their professional careers. That speculation is shown to be true in this study. In extending Levin and Shaker's findings to engineering faculty, there is a third identity, that of a practicing engineer.

Among the participants of this study are faculty members who had spent decades practicing engineering and had risen to upper levels of management before returning to the university to teach. Ten of thirteen participants had practiced engineering in the field for five years or more. This identity as a professional engineer mitigates the negative effects of disrespect and isolation as the faculty member has a source of self-efficacy to draw upon. Participants in this study explained how they believe this career experience make them effective teachers. As they form their students into professional engineers, they believe that their identities as professional engineers

give them a vision of the necessary skills, abilities, and values to pass onto their students.

Having career experience, especially if that career experience involved being in a position of authority, seemed to also be a liability. Participants who feel the sting of disrespect most clearly were participants who had enjoyed significant respect and authority in their previous careers. The humbling experience of having the lowest status in the department does not fully account for their dissatisfaction. Their dissatisfaction was heightened by the devaluing of their career experience by their department head, their faculty colleagues, and by university or departmental policy.

The identity of non-tenure-track faculty as professional engineers and its effect on their role as teaching faculty is a direction for future research.

Second-Class Citizens

Non-tenure-track faculty expect to be valued and respected as equal members of their academic community (Haviland, Alleman, & Allen, 2017). Non-tenure-track faculty expect to have the right to participate in departmental governance. A lack of long-term job stability and a desire to contribute to shared department goals make non-tenure-track faculty easy to exploit and make them deeply dependent on the good will of their administration and tenure-track colleagues to protect their rights (Haviland et al., 2017).

The participants in this study understand that working at a research university means that the tenure-track faculty are expected to produce research, which is an important, perhaps the most important, contributor to their rank and standing. Since non-tenure-track teaching faculty have a limited role in research, they know their work

is at risk of being undervalued. Quotes from our participants such as “I emphasize in teaching, but because I can’t emphasize in research I’m apparently not useful”, “They don’t respect what we do, we’re not bringing in research dollars, but we are teaching”, “Tenure-track faculty make a lot more, but I suppose that’s reasonable since the tenure-track-faculty are bringing in the serious dollars. They’re more valuable in that sense” show that non-tenure-track faculty understand that their work will never hold the same prestige as research. However, they do expect that their contributions to the teaching goals of the department and university will be valued and recognized. Division of labor should not lead to status differences (Levin & Shaker, 2011).

Whether intentional or not, the administration and tenure-track faculty have created an environment for many of our participants in which they are “second-class citizens”. Participants report being seen as “lackey”, “less valuable”, “like a student”, “fill-in”, “expendable”, “not welcome”. These judgements are often based on deficit-model comparisons. The department head and faculty colleagues may not be aware of their use of a deficit-model when evaluating the value of non-tenure-track faculty members. Engineering programs should examine the role of all faculty members, determining how each contributes to the goals of the department, and recognize that career experience is valuable and teaching contributions are valuable. These changes are necessary as cultures where faculty are not valued and respected lead to poorer student outcomes (Hollenshead et al., 2007; Kezar, 2013).

Conclusion

Non-tenure-track faculty comprise 9% of the full-time instructional faculty in US engineering programs at four-year research universities. The economic and

structural factors that have led to the growth of non-tenure-track positions are unlikely to reverse so it is reasonable to expect that non-tenure-track faculty will be a significant part of engineering faculty in the future. Developing departmental cultures in which all faculty, tenure-track and non-tenure-track are respected and valued leads to greater faculty engagement, increased career satisfaction, and better student outcomes (Gappa et al., 2007; Kezar, 2013). Concrete steps to develop policies and departmental structures to achieve a positive work climate for non-tenure-track faculty have been identified (Kezar, 2013; Gappa et al., 2007; Hollenshead et al., 2007) and they are not expensive.

Most, but not all, of the participants in this study know they are working in a departmental culture that would be classified as a neutral or invisible culture (Kezar, 2013). The terms that some of them use to describe their place in the departmental hierarchy, “irregular”, “second-class”, “lackey”, “fill-in”, show their awareness of their diminished status. Over time, some of our participants have been able to earn the respect of their colleagues, but that took years and presumably during that initial period they did not enjoy that respect. They are not necessarily inferior or less qualified than their tenure-track colleagues for the positions that they hold as teachers (Hollenshead et al., 2007) and in fact bring specialized skills, knowledge, and viewpoints into their classrooms (GAO, 2017). These faculty are not inferior because they are different from the tenure-track faculty. They expect not to have a voice on tenure decisions or on graduate studies, but they do expect to have a voice on the goals and objectives of the department, especially in the issues that impact the undergraduate students they teach. They are often excluded from these discussions. There are opportunities here for

increased faculty engagement, for the welcoming of a diversity of ideas, for viewpoints that result from years of experience in engineering practice. Those opportunities are being missed in most departments in this study.

Future Work

Non-tenure-track engineering faculty seem to have three identities: teacher, faculty-member, practicing engineer. How these three identities interact should be studied. The ability of career experience to mitigate experiences of disrespect and exclusion call for further study. We also wonder about the self-perception of non-tenure-track faculty and what strategies they use to reconcile the negative views of some of their peers with their generally positive self-worth as faculty members. A national quantitative study to determine how non-tenure-track faculty in general feel they are respected and included by their departments could be pursued.

Chapter 7: Conclusion

The purpose of this study is to examine the role of full-time non-tenure-track faculty working in colleges of engineering. Interviews of the faculty reveal their beliefs about their career and their experiences that influenced those beliefs. A remarkable diversity of career and academic experience runs through their stories. The participants spoke about their prior careers, their often convoluted paths into the teaching profession, their career aspirations, their satisfaction in teaching and working with students, and their anger and frustration at policies and biases from their administration and colleagues. Participant stories help frame the answer to our research questions:

1. What are the academic and career experiences of full-time non-tenure-track engineering faculty?
2. What factors, if any, motivate full-time non-tenure-track engineering faculty members to pursue a teaching career?
3. Do full-time non-tenure-track engineering faculty desire tenure-track positions?
4. What career progression, if any, is available to full-time non-tenure-track engineering faculty members?
5. What aspects of tenure, if any, do full-time non-tenure-track engineering faculty members find attractive and which, if any, do they find unattractive?

The remainder of this chapter consists of a discussion of each research question, followed by recommendations for programs that wish to improve the satisfaction of their full-time non-tenure-track faculty, and ending with recommendations for future work.

Academic and Career Experience

The participants' academic and career experience shows remarkable variation prior to their appointment as a full-time non-tenure-track faculty. Seven of our participants have earned a doctoral degree, six participants have not. The participants who have not earned a doctoral degree felt that a doctoral degree in their discipline would not improve their teaching, and in fact would distract from it. Their disinterest in pursuing a doctorate does not imply that they are uninterested in research. Some participants who did not have a doctoral degree are interested in engineering education research and have published conference papers on the topic of engineering education. Participants who do have earned a doctoral degree did not express frustration regarding departmental policies requiring a doctoral degree for hiring or promotion of full-time non-tenure-track faculty. Only one of the thirteen participants earned their doctoral degree before beginning their professional career. The remaining participants with doctoral degrees either earned the degree while working professionally or left their professional career to return to the university with the intention of earning the degree.

Ten of the participants' career experiences were similar; three of the participants had professional careers that were significantly different. The ten whose careers were similar worked as engineers for corporations or government agencies doing technical work for many years, the shortest professional career being seven years and the longest being thirty-five years. All participants with professional experience describe it as an asset, a pool of experience that they draw on for practical examples and that provides them with a vision of the knowledge and skills their students will require to be successful practicing engineers. Of the three participants whose careers were not in the

engineering profession, one had a career as an internationally competitive athlete and coach, the second began teaching immediately after earning a master's degree, and the third had experience in a variety of businesses before returning to engineering school to earn a bachelor's and master's degree in engineering.

Motivation for Pursuing a Teaching Career

All participants are motivated to teach by a combination of three factors: teaching and working with students, intellectual autonomy, and the ability to achieve a satisfactory balance between their work and personal lives. These are the same factors that motivate non-tenure-track faculty from other disciplines (Waltman et al., 2012). This study did not find any additional motivational factors that are specific to engineering faculty.

Full-time non-tenure-track engineering faculty enjoy teaching. They report avoiding activities like research that would take them out of the classroom and away from student interaction.

No Desire to Be Tenured

Full-time non-tenure-track engineering faculty have no desire to pursue a tenure-track position. All participants responded without hesitation that they were not at all attracted to the research and publication requirements inherent to a tenure-track position at their university. While a parallel career track focused on teaching would be welcome, crossing over to the tenure-track is unappealing to all participants.

It should be noted that all participants answered this question with the understanding that pursing tenure meant fulfilling the requirements for tenure in their program. Since the sampling method in this study selected only programs in

engineering schools with a Carnegie classification of R1, the requirements for tenure include a significant amount of research and publication with a lesser emphasis on teaching. None of the participants believe that a viable path to tenure existed for them but that was not an issue because none of them would be interested in pursuing that path even if it did exist, given what gaining tenure in their department would entail.

Career Progression

Although none of the participants desire a tenure-track position, they do desire some aspects of tenure. Ten participants were asked about career progression. Four of the participants report that they hold titles that sound like tenure-track titles but with the modifiers "teaching" or "practice" added, for example Associate Professor of Practice. There is a clear path for promotion for these four participants and they felt that they understood the requirements for promotion.

Another four participants report career advancement schemes that are less clearly defined. Other titles for full-time non-tenure-track faculty include variations on the titles instructor and lecturer, sometimes with the modifier "senior" added to denote an advanced position. One university uses a nine-cell matrix with the titles instructor, lecturer, and senior lecturer, each having a rank of one, two, or three, although in practice only two of the cells are populated by faculty members. These four participants felt that the requirements for promotion were less clearly defined. One participant investigated the question prior to the interview and was surprised to learn that he was eligible for a promotion in a short time. He had previously been unaware of the requirements for promotion. For these four participants, a structure for career advancement was in place but it was not being used effectively.

The final two participants could not describe their opportunities for career advancement. They did not know if the opportunity for career advancement in their program exists.

Career progression for full-time non-tenure-track faculty exists and is clearly defined in only four of the eleven programs in our study. In other programs, however, we found that a structure for career progression had been put in place and was not being used effectively.

Attractive and Unattractive Aspects of Tenure

While the participants are not interested in being tenured or tenure-track, there are aspects of tenure they desire. The aspects of tenure that full-time non-tenure-track faculty find attractive are career stability, higher salary, and respect. The topic of career stability in this study is paradoxical. On one hand, participants reported that they "will never be let go" because the courses they teach are critical to the department and thus the department depends on them. On the other hand, facing contract renewal was a source of stress for the participants. A clue to understanding this paradox comes from the participant who had a multi-year contract. That participant enjoys the ability to plan ahead, and with a planning window of five years, he is confident that he will be able to execute the plan fully. Shorter contracts, especially lengths of a semester or one year, emphasize to the full-time non-tenure-track faculty that even though they may be needed, they are temporary, and next year things may change.

Participants report the desire for a higher salary, but in the same way that most workers desire a higher salary. Salary is not a significant dissatisfier for these non-tenure-track faculty although they did note that the tenure-track faculty were paid more.

Many participants noted that this career path is not one someone should choose if a high salary is important, as salaries in industry are higher. Like short contract lengths, lower salaries signal to the non-tenure-track faculty that they are worth less to the department and their contributions are not valued as highly.

The most important attribute of tenure desired by full-time non-tenure-track faculty is the respect of their peers. When asked to describe what tenure meant to them, participants spoke of "you're officially part of the department," "you're part of the family," and "it's a vote of confidence in your abilities as a faculty member." For most full-time non-tenure-track-faculty, there is never a point in which one is accepted into the faculty in the same way that granting of tenure does. Acceptance or belonging by the department is an important aspect of career progression that can be addressed without granting tenure itself. An alternate career track, for example career progression through the ranks of Assistant Teaching Professor, Associate Teaching Professor, and Teaching Professor, can reinforce to the full-time non-tenure-track faculty member that their contributions are valued. Career progression signals to the full-time non-tenure-track faculty member that they are accepted by the other faculty members of the department as opposed to promotion that is based on time-in-service or granted by the department head only.

The aspect of tenure-track faculty work that provoked the strongest reaction was an aversion to writing research proposals and publishing research findings, both requirements for tenure-track faculty at their institution. It is not likely that the full-time non-tenure-track faculty are averse to research itself because many of them came from research backgrounds in industry. The writing process itself and the "grind" of

developing proposals for funding had very low appeal to the full-time non-tenure-track faculty. They want to teach; writing proposals and research papers would take them out of the classroom where they enjoy working.

Respect and Inclusion

One theme clearly emerged from the interview data although no interview question explicitly asked about it. Non-tenure-track full-time faculty members desire respect from their colleagues and administrators and they desire inclusion in the life of the department, particularly in decisions that affect their work. Participants spoke about being overtly excluded from departmental meetings and planning retreats. They described being asked to remain silent while the tenure-track faculty discussed matters germane to the full-time non-tenure-track faculty member's daily work. This overt exclusion causes significant negative emotions among the full-time non-tenure-track faculty.

Being able to attend departmental meetings or retreats, and in some cases having a vote, is a welcome opportunity for full-time non-tenure-track faculty. Having a vote and being in the room, however, does not imply a full participation in governance. When disagreements arise in department meetings, non-tenure-track faculty are at a distinct disadvantage. Most full-time non-tenure-track faculty are employed on annual contracts. There is no need to fire a non-tenure-track faculty member, they can simply not be renewed and the decision usually rests solely with the department head. No due process is involved in releasing a non-tenure-track faculty. Having a vote feels inclusive but the non-tenure-track faculty member's ability to be honest and forthright is compromised by their employment terms. This situation can be resolved by using a

rolling contract, especially for full-time non-tenure-track faculty members who have served in the department for many years. A rolling contract is a fixed-term appointment in which the contract length is refreshed each year. For example, a full-time non-tenure-track faculty member on a three-year rolling contract would, at the end of each academic year, either have their contract renewed for the next three years or be notified that their current three-year contract is not being extended. Rolling contracts also avoid the negative emotions and stress associated with contract renewal.

While discussing issues of respect, participants in this study clearly did not consider themselves to be inferior as engineers or as teachers. Their self-efficacy mitigated disrespect from their colleagues and gave them additional confidence, although in some cases it made the sting of disrespect more pronounced. Participants who were successful engineers before returning to the university to teach carried with them an identity as a competent, professional engineer. This finding extends Levin and Shaker's (2011) work, providing a third identity that may be specific to engineering non-tenure-track faculty. This finding was unexpected in the interview data and warrants further investigation.

Whether intentional or not, most engineering programs have policies and structures in place that disadvantage non-tenure-track faculty. The full-time non-tenure-track faculty in this study are well-aware of their diminished status in the department. It may be that tenure-track faculty do not realize that departmental policies are biased as privileged members of a group may not recognize their own privilege (Valian, 1998; McIntosh, 1988). Respect and inclusion are urgent, important areas for future research.

Recommendations for Practice

Administrators and non-tenure-track faculty members understand that the diverse career experiences and skills that non-tenure-track faculty bring to the classroom enrich engineering programs, especially if those non-tenure-track faculty have experience in the engineering profession (Lasfer & Pyster, 2012). Non-tenure-track faculty are satisfied with their careers, being only slightly less satisfied with their careers than tenure-track faculty (Waltman et al., 2012). Prior studies have identified changes to departmental policy changes that make non-tenure-track faculty more satisfied and effective members of their programs. The changes are not expensive and are not difficult to implement (Hollenshead et al., 2007; Kezar, 2013).

Formalizing the hiring process for full-time non-tenure-track engineering faculty is one change that can be made quickly and inexpensively. Programs should be intentional in their recruitment of full-time non-tenure-track faculty. Most tenure-track-faculty in this study were hired serendipitously by the department head or dean. There may be a strategy in serendipitous hiring; administrators report that they often hire non-tenure-track faculty with specialized skills to fill a gap in the department. While serendipitous hiring does have advantages, formalizing the search process has more important advantages (Kezar, 2013; Gosink & Streveler, 2000). Writing a set of requirements for the full-time non-tenure-track candidate encourages the department to consider how this new faculty member will fit into the existing structure and what the new faculty member is expected to contribute. A search committee comprised of faculty other than the department head alone allows those faculty members to "buy in" to the candidate's skills. A formal search allows for a wider pool of applicants to apply for the

position. There is a danger, however, in formalizing the search. The search committee and department head must be careful to not write the requirements for the position using a deficit-model based on tenure-track requirements. For example, the necessity of a doctoral degree should be carefully considered. Many practicing engineers work in organizations that do not encourage or value the pursuit of a doctoral degree. The department should consider what the value of the doctoral degree is to the position and consider alternate requirements that fit the culture of practicing engineers.

Another set of policy improvements that can be implemented at a low cost is a meaningful career path for full-time non-tenure-track faculty that is aligned with the motivations and goals of the full-time non-tenure-track faculty member. Engineering programs should develop and use a system of career advancement that provides evaluation, differential ranks, multi-year contracts, and specific promotion criteria for full-time non-tenure-track faculty. All faculty should have clearly defined roles and responsibilities. Ranks provide the feeling of accomplishment and communicate to the full-time non-tenure-track faculty member that their contributions toward organizational goals are valued by the department. Increasing the contract length as the faculty member advances in rank allows the faculty member to plan more effectively. Increasing the contract length does not have to reduce the budget and staffing flexibility that full-time non-tenure-track faculty bring to a department. Many contracts, including those of tenure-track faculty, have clauses specifying that in the case of a financial contingency or in the case of a documented performance issue, the contract may be terminated early. An alternate to an increased contract length is an increase to the advanced notification of non-renewal. This still allows the institution to maintain

financial flexibility, yet decreases the stress and anxiety for the full-time non-tenure-track faculty that is associated with contract renewal. While notice of non-renewal is not equivalent to due process, a one-year notification of non-renewal provides the full-time non-tenure-track faculty member some assurance of not being "let go" at the whim of the department head. Due process in general does not apply to renewable term faculty because without the presumption of renewal, the non-tenure-track faculty member's contract can simply be allowed to expire.

Many participants in this study are interested in engineering education research, especially the scholarship of teaching and learning, but find that the requirements for promotion require scholarship in their specific engineering discipline. The practice of having promotion criterion that are not aligned with job responsibilities (e.g. requiring faculty with primary job responsibilities in teaching to perform research for promotion) also deserves reconsideration. Programs that have research requirements for teaching faculty should at least allow scholarship in engineering education in place of research in their specific engineering discipline for purposes of evaluation and promotion. Encouraging non-tenure-track faculty to engage in engineering education research allows them to build professional social capital (Lin, 2002).

Engineering programs should allow full-time non-tenure-track faculty to participate in governance at the department, college, and university level and to serve on committees that affect their work. The participants of this study understand not being able to serve on the graduate committee or to vote on tenure decisions since those issues are outside of their scope of work. They do wish to have input on the curriculum and to serve on the undergraduate committee.

Every engineering program should strive to treat all their members, tenure-track, non-tenure-track, and staff with respect. The department and its members should value each other based on individual contributions towards the goals of the department. At a four-year research institution, funded and published research is considered the highest value activity and is the primary factor in promotion for tenure-track faculty. Teaching is also important. The full-time non-tenure-track faculty in this study understand that their work, as well as the teaching work of tenure-track faculty, is not valued as highly as funded research. They do, however, expect recognition that their teaching is advancing the goals of the department and they expect to be recognized when their teaching is excellent.

These recommendations are simple, easy to implement, and cost very little. Making these changes will significantly improve the satisfaction of full-time non-tenure-track faculty members. Non-tenure-track faculty are a growing segment of the academic workforce and have a major impact on undergraduate engineering education. Being intentional in the way this new faculty majority is hired and retained will have a significant positive impact on engineering education.

Transferability of Findings

The results of this study are transferable to many full-time non-tenure-track engineering faculty. The results of this study are not, however, generalizable to the population of all full-time non-tenure-track faculty in the United States. The difference between transferability and generalizability is an important distinction.

Generalization is a result of studies with large, randomized, sample sets. The responsibility to prove generalization is placed on the researcher. Transferability is

associated with qualitative studies that rely on careful research design and data collection to demonstrate reliability. The qualitative study does not attempt to prove that the findings apply to all full-time non-tenure-track faculty, the reader can decide whether the results transfer to their situation. The responsibility to assign transferability is placed on the reader (Borrego et. al, 2009). Readers who are full-time non-tenure-track engineering faculty members can certainly compare the experiences reported by the participants to their own experience. Readers who are tenure-track faculty or administrators can talk to full-time non-tenure-track faculty in their departments, using the study as a starting point, to see if these findings apply to them.

Contributions to Knowledge

This study contributes to the field of engineering education. It increases the knowledge of full-time non-tenure-track engineering faculty and the cultures in which they work by exploring their career goals, career pathways, and experiences of disrespect and exclusion.

This study has shown that full-time non-tenure-track faculty desire career stability, the opportunity for meaningful career advancement, to have their work and talents valued by the department, and the respect of their colleagues. They do not desire tenure in the way that tenure is defined in their departments. The careers of NTT faculty can be more meaningful if attention is paid to these career attributes. One might suggest that creation of an alternate career track for full-time non-tenure-track faculty could be implemented at minimal cost and with minimal disruption to departmental policy.

This study has also shown that significant challenges remain in the areas of respect and inclusion of full-time non-tenure-track engineering faculty. It has described

disrespect and exclusion from the participant's point of view and given a voice to the emotions and feelings produced by disrespect and exclusion.

Finally, this study has identified the presence of a third identify for full-time non-tenure-track faculty who have had a professional career. The identities of teacher and faculty member were already known; the identity of professional engineer was not. The additional identify as professional engineer sometimes appears to mitigate disrespect and exclusion but can also sharpen the sting of disrespect especially when the participant juxtaposes their current position with their former position of authority and respect.

Future Work

This study provides an interesting look into the background, working conditions, and career goals of full-time non-tenure-track faculty, and like many inductive qualitative studies, it opens more avenues for exploration.

With ten out of ten participants in the first set of interviews reporting that they have no desire to become tenure-track faculty, it seems likely that a large portion of full-time non-tenure-track faculty feel this way. A nationwide quantitative study should be pursued to validate this hypothesis.

The emergent theme of respect and inclusion deserves a closer look. The responses from the participants are visceral and emotional. The phrase "I wanted to rip his throat out" signifies that there is an issue here that has been festering for some time. Nine out of thirteen participants spoke of respect or inclusion without being explicitly prompted. Clearly this issue needs further qualitative study to understand the nuances of how respect and disrespect are communicated within departments. A national

quantitative study to measure the level of dissatisfaction with respect would be valuable.

It was evident from the interview data that the participants of this study did not consider themselves to be inferior members of their department. Levin and Shaker's work on the dual-identity of non-tenure-track faculty as respected in the classroom but disrespected by their departments partially explains the data, but there is more here (Levin & Shaker, 2011). The participants drew self-efficacy from their identity as practicing engineers to defend themselves from the disrespect of their peers.

A study on the hiring and promotion criteria for non-tenure-track faculty to examine deficit-model bias may be revealing. It is possible that many engineers who work outside of the academy and who would be valuable part-time or full-time faculty members are being excluded by requirements that make sense in an academic culture but do not translate to their engineering practice outside the academy.

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Appendix A

Recruitment Email

[Title][Name],

My name is Cliff Fitzmorris and I'm a lecturer at the University of Oklahoma in the College of Engineering. I'm writing a paper on the career pathways and experience of non-tenure-track, full-time engineering faculty for the Frontiers in Education 2017 conference. As part of the paper, I'm interviewing ten non-tenure-track engineering faculty members from different universities to talk about how they became full-time faculty members and explore the ways, if any, that their career is similar or different than they expected it to be.

From your department's website, I notice that you are a full-time, non-tenure track faculty member and so I wonder if you would be willing to be one of my ten participants for the study. Your answers will be kept private and confidential and the telephone interview would take about 45 minutes. I am offering a gift card as a token of my appreciation to those who are willing to participate.

Please let me know if you would be willing to share your experience of being a non-tenure-track, full-time engineering faculty member. If you are, I will send you more details about the study and a consent form.

In some ways, we are referred to as "the invisible faculty" and I hope you'll help me make us a little less invisible!

Best Regards,

Cliff Fitzmorris

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Norman, OK 73019

Appendix B

Interview Protocol, First Set

Introduction

I wanted to start by thanking you for agreeing to participate in this interview. I'm interested in the career goals of full-time, non-tenure track teaching faculty in engineering. Some of the questions I'll ask are specific, other questions are more general and open ended. Take all the time you need to think about the question and feel free to elaborate. Tell stories if you want to, I'm interested in your life as a non-tenure-track faculty member. Depending on your answer, I may ask probing questions to help me understand your answer or explore something interesting that you said. You also have the option of declining to answer – passing on – any of the questions.

I want to remind you about the confidentiality of this study. I am using an audio recorder, and that is to allow me to analyze the interview after we're finished. Your name will not appear in publications and we will conceal details that could be used to identify you. There will be one sheet that links your name to the transcript, it will be securely locked up, and no one besides me will see it. The audio files will be encrypted. While I may quote you in the publication, it will not be attributed to you. I want you to

feel free to answer honestly and to know that what we talk about will not be traced back to you.

Do you have any questions before we start?

Questions

1. What is your title at the university?
2. What are all of the titles in your department that are available to full-time non-tenure-track faculty?
3. Tell me about how people move up through the non-tenure-track ranks in your department.
4. What are the differences between the different full-time non-tenure-track faculty ranks?
5. What are the differences in responsibility between full-time non-tenure-track faculty ranks?
6. What are some of the perks of the different full-time non-tenure-track faculty ranks?
7. If you were to give career advice to a new full-time non-tenure-track faculty in your department, what advice would you give them?
8. If you knew someone who was considering becoming a full-time non-tenure-track faculty member, what advice would you give them?
9. What is your understanding of tenure?
10. Tell me about what it would take for a full-time non-tenure-track faculty to become tenure-track in your department.

11. What are the differences between tenure-track and full-time non-tenure-track faculty members of your department?

12. What are the benefits of being tenured that you wish were part of your position?

13. What are the parts of being tenured that you're happy are not part of your position?

14. Given what it takes in your department to become tenured, tell me about your decision process to either pursue or not pursue tenure.

Closing

Now that we are done, do you have any questions you'd like to ask me about this research project? If you want to contact me later, here is my contact information (You may give them your business card or follow-up contact information sheet). Also, I may need to contact you later for additional questions or clarification. Would you mind if I sent you an email to follow up?

Interview Protocol, Second Set

Introduction

I wanted to start by thanking you for agreeing to participate in this interview. I'm interested in the career goals of full-time, non-tenure track teaching faculty in engineering. Some of the questions I'll ask are specific, other questions are more general and open ended. Take all the time you need to think about the question and feel free to elaborate. Tell stories if you want to, I'm interested in your life as a non-tenure-track faculty member. Depending on your answer, I may ask probing questions to help

me understand your answer or explore something interesting that you said. You also have the option of declining to answer – passing on – any of the questions.

I want to remind you about the confidentiality of this study. I am using an audio recorder, and that is to allow me to analyze the interview after we're finished. Your name will not appear in publications and we will conceal details that could be used to identify you. There will be one sheet that links your name to the transcript, it will be securely locked up, and no one besides me will see it. The audio files will be encrypted and will be kept indefinitely. While I may quote you in the publication, it will not be attributed to you. I want you to feel free to answer honestly and to know that what we talk about will not be traced back to you.

Do you have any questions before we start?

Questions

1. Tell me about when you realized that you wanted to teach in a college classroom.
2. Describe your career from your graduation until your first university teaching position.
3. How did your first university teaching position come about?
4. What do you think motivated the university to hire you as a NTT/FT?
5. Could you describe your onboarding experience?
6. How long was it between when you were hired by your department and the beginning of your first class? {Probing Question: Did you have adequate time to prepare to teach it?}

7. Before I ask this next question, I want to be clear that I am not asking about the amount of your salary or your specific benefits. Could you describe the process for deciding what your salary and benefits would be?

8. Tell me about your first teaching assignment. {If items from this list are not mentioned, ask a probing question: Office Space, Explanation of Departmental Policies, Mentoring, Training, Teaching Assistants, Determination of Courses}

9. Describe your teaching career from the time you began your first teaching assignment until now. {Probing questions avenues: Adjunct? What courses? Experience of Teaching?}

10. What were the things you were looking forward to, if any, when you first became a NTT?

11. What were your concerns, if any, when you transitioned to a NTT/FT faculty member?

12. Looking back over your teaching career at the university, what has been a pleasant surprise teaching in your engineering program?

13. Looking back over your teaching career at the university, what has been surprisingly difficult or unpleasant about teaching in your engineering program?

14. What is the best thing about teaching in your program?

15. What is the most difficult or unpleasant thing about teaching in your program?

16. Do you ever think about doing something else besides teaching? {If no: move on. If yes: describe why you think about switching and what you would switch to}

17. What motivates you to continue teaching?

Closing

Now that we are done, do you have any questions you'd like to ask me about this research project? If you want to contact me later, you may call me at the number listed on your consent form or email me at cfitzmorris@ou.edu. Also, I may need to contact you later for additional questions or clarification. Would you mind if I sent you an email to follow up?